PLUTONIUM RECLAMATION FACILITY INCIDENT RESPONSE PROJECT PROGRESS REPORT

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EXECUTIVE SUMMARY

Purpose of Report

This report provides status of Hanford activities in response to process deficiencies highlighted during and in response to the May 14, 1997, explosion at the Plutonium Reclamation Facility. This report provides specific response to the August 4, 1997, memorandum from the Secretary which requested a progress report, in 120 days, on activities associated with reassessing the known and evaluating new vulnerabilities (chemical and radiological) at facilities that have been shut down, are in standby, are being deactivated or have otherwise changed their conventional mode of operation in the last several years. In addition, this report is intended to provide status on emergency response corrective activities as requested in the memorandum from the Secretary on August 28, 1997. Status is also included for actions requested in the second August 28, 1997, memorandum from the Secretary, regarding timely notification of emergencies.

Background

On May 14, 1997, an unanticipated chemical reaction in Tank A-109 at the Plutonium Reclamation Facility caused approximately 20 gallons of hydroxylamine nitrate and nitric acid stored in a 400 gallon storage tank to explode. This incident raised concerns related to recognition of vulnerabilities and hazards within facilities, as well as emergency response performance to the incidents. A full range of protective requirements and equipment, organizations, plans, procedures, communications systems and organizational interfaces were present at the site. Although many facets of the response to the incident worked well, there were process and implementation flaws that required correction. Corrective activities began immediately following the incident and will continue through fiscal year 1998.

Site Response

To supplement immediate corrective measures and to assure that the improvements needed were comprehensive, timely, and focused for action, Fluor Daniel Hanford Inc., established an action team which defined and is implementing the Plutonium Reclamation Facility Incident Response Project. This project effort was expanded to include all site prime contractors with Fluor Daniel Hanford, Inc. providing project management and integration. This project effort has been organized into the five areas, which became separate project teams, as follows:

- Emergency Response
- Occupational Health
- Radiation Protection
- Training
- Chemical and Radiological Vulnerability

Corrective measures developed by each team are integrated through a project logic and integrated project schedule. The project effort is enhanced through full and active participation from the U.S. Department of Energy Richland Operations Office staff and all prime contractors.

Representatives from the Washington State Departments of Ecology and Health, the U.S.Environmental Protection Agency, Benton County Emergency Response organization, and other involved agencies participated as well.

Assessments and Investigations

Two U.S. Department of Energy Richland Operations Office accident review boards were convened to investigate 1) the events leading up to the explosion and 2) emergency response to the explosion. These investigations formed the basis for initial corrective activities. Other independent investigations were conducted by the Washington State Department of Ecology and the Washington State Department of Health. The Washington State Department of Ecology findings were formally documented and provided in a Notice of Correction on September 16, 1997. Additionally, four memoranda were received from the Secretary outlining specific actions to be taken by field offices. The findings, corrective measures and initiatives have all been encompassed into a site-wide corrective action plan.

Concurrent with the external investigations, numerous site-wide and facility specific assessments were conducted to evaluate vulnerability and assess existing processes. The U.S.Department of Energy Richland Operations Office, prime contractors, and subcontractors reexamined records and chemical inventories for hazardous and reactive chemicals. As a result, the majority of the hydroxylamine nitrate on site was removed. Only laboratory quantities of hydroxylamine nitrate remain and it is in safe storage. Professionals and industry experts were contracted to independently review vulnerabilities, chemical management and emergency response processes. The site prime contractors have either completed or are in the process of conducting facility vulnerability assessments as discussed in further detail in this report.

Project Status

An integrated plan of action and schedule for the Plutonium Reclamation Facility Incident Response Project was issued in October 1997. The plan of action and schedule form the basis of monthly status reports and monthly briefings to the U.S.Department of Energy Operations Office Manager. As corrective action/process change specifics are developed, baseline and cost impacts will be assessed, change requests processed and the schedule adjusted as necessary. Response to the Secretary's Initiatives due in September and October have been completed on schedule. In responding to the Washington State Department of Ecology corrective measures, a series of workshops were conducted in November 1997 to jointly develop strategy and approach among the U.S.Department of Energy Richland Operations Office, site contractors, and the Washington State Department of Ecology personnel. Summary status by area is as follows:

Emergency Response: An independent assessment of the site emergency response process and central emergency response organization was completed by Excalibur Associates, Inc. In addition, a root cause/barrier analysis was completed to determine systematic process improvements needed. Several Initiatives have been implemented to improve notification of offsite agencies, revise Emergency Action Level procedures, retrain and recalibrate emergency responders, prepare for earlier and more efficient activation of the Emergency Operations Center and assure adequate information and resources are available. Significant activities planned include restructuring of Incident Command, upgrading the site exercise and drill program, integrating

environmental requirements and streamlining emergency plans, procedures and notifications.

Occupational Health: Measures taken to improve protection of emergency responders and improve care and treatment of exposed workers include upgrading the Hanford Patrol respiratory protection program, implementation of employee workforce health advocate positions, review of personnel protective equipment used by the Hanford Fire Department, providing dedicated Industrial Hygiene support to the Hanford Fire Department and providing additional Hanford Environmental Health Foundation physician support in response to emergencies that involve employee exposure and hospital treatment. Future actions focus on negotiating and documenting new medical protocols for chemical and radiological exposures with local hospitals including providing better hazards information to the hospitals as well as evaluating the need and process for chemical plume tracking.

Radiation Protection: The radiological response to emergencies has been was flowcharted to determine gaps and process improvements needed. A need was identified for the Hanford site to identify and obtain radiological resources for back shift response. An off-shift duty roster has been published and radiological support to Incident Command is being finalized. The most significant activity identified is enhanced training of the radiological staff to be better prepared to support a variety of facilities and the Incident Command in emergencies.

Training: The training effort has focused on identifying the processes that are changing on site that require training and working with the teams that are developing the new processes to ensure that the appropriate training will be developed and implemented as part of the process implementation plan and schedule. Additionally, existing training programs are being assessed for adequacy and upgraded as necessary. Training analysis, design and material development are being performed in parallel with process review and upgrade efforts, where possible, to minimize overall training impact on facilities and projects. Some training specific upgrades as a result of this initiative have been developed and are currently being used for training of site personnel.

Chemical and Radiological Vulnerability: The chemical and radiological vulnerability effort includes assessment of facilities, and the development of chemical management system strategy and requirements. This effort will also address the independent DuPont assessment and recommendation on chemical management processes, review of chemicals in use, and emergency response to chemical incidents. The site prime contractors are in varying stages of assessing facility vulnerabilities and implementing corrective measures as discussed in further detail in this report. All prime contractors completed an assessment of reactive and hazardous chemicals after the Plutonium Reclamation Facility explosion.

Pacific Northwest National Laboratory initiated an aggressive process to assess vulnerabilities and implement corrective actions beginning in fiscal year 1996. Their continued activities include ongoing assessment and evaluation and extensive facility walkdowns in fiscal year 1998.

The Bechtel Hanford, Inc. facility vulnerability review included an immediate reassessment of facilities supplemented with an independent review of their 1994 chemical vulnerability report. The independent review confirmed Bechtel Hanford’s findings of low risk for an accident such as

the Plutonium Reclamation Facility explosion.

The Fluor Daniel Hanford, Inc. team chemical inventory review completed in June has been expanded to include a prioritization of facilities and immediate review of the five top priority facilities. This will be followed by reviews of remaining facilities beginning in January 1998.

The U.S. Department of Energy Richland Operations Office line management staff are conducting independent reviews of facilities to validate the rigor and thoroughness of the contractor vulnerability assessments.

Ongoing Activities and Assessments

The Plutonium Reclamation Facility Incident Response Project is focusing on near term, immediate actions needed to improve processes and reduce risk. The ongoing process to identify system weakness, assure facility vulnerabilities are routinely recognized, assessed and mitigated and to assure continuous process improvement is embodied in each prime contractor Integrated Environment, Safety and Health Management System which will incorporate the existing elements of risk identification, mitigation and work planning processes. The Pacific Northwest National Laboratory has implemented an Integrated Environment, Safety, and Health Management System. The Fluor Daniel Hanford, Inc. Integrated Environment, Safety, and Health Management System was approved in September and is in the process of being implemented. Bechtel Hanford, Inc., is in the process of developing an Integrated Environment, Safety, and Health Management System.

Another significant ongoing activity is the development of a set of chemical management system requirements for the Hanford Site. The prime contractors will use these requirements to evaluate the adequacy of their programs, identify opportunities for improvement, implement changes as appropriate and drive the day-to-day management of chemicals.

The site processes for ongoing independent assessment and action tracking have been enhanced through implementation of a new the U.S.Department of Energy Richland Operations Office and Fluor Daniel Hanford, Inc. deficiency tracking system. In addition, the U.S.Department of Energy Richland Operations Office provides oversight and assessment of contractor processes and results and each prime contractor has a self assessment function to oversee their facilities.

This project team also continues to develop a streamlined notification system which will enhance the site’s ability to effectively and (timely) communicate issues that are of an interest to the state, local governments and citizens.

Perspective

While process weaknesses became apparent during and immediately after the Plutonium Reclamation Facility explosion, the fact that basic emergency response processes and systems were in place must be recognized. The Plutonium Reclamation Facility Incident Response Project will provide immediate and focused attention to identifying and implementing corrections and upgrades to those processes. Implementation of the safety management systems along with

strengthening chemical management processes and practices will provide assurance of long term management of risks and vulnerabilities and protection of the public, workers and the environment.

Organization of This Report

This progress report has been designed to satisfy two progress reports requested in the memoranda from the Secretary and to provide general status of all project activities. The August 4, 1997, Secretarial Memorandum asked for vulnerability assessment status within 120 days (by December 2, 1997). Overall status was requested by the end of December 1997. This report provides all status. Hanford proposes to send a shorter, monthly status update following the end of each month starting on January 31, 1998. These updates would continue until a mutually agreed upon date when all remaining actions are fully incorporated and tracked by long term procedures and processes.

Sections 2.0, 3.0, and 4.0 were developed in response to the August 4, 1997 memorandum requesting a progress report on facility vulnerability assessment activities and in response to discussions with the U.S.Department of Energy Headquarters staff.

Section 5.0 provides status on activities requested in the October 21, 1997 Secretarial Memorandum. The information requested in this October 21, 1997 memorandum is immense. Hanford recommends that a conference call with U.S. Department of Energy Headquarters be set up to discuss the October 21, 1997 memorandum. Clarification on this request is needed.

Section 6.0 provides status of initiatives called for in the two memorandums of August 28, 1997. Project specific vulnerability assessment activities and status are included in the appendices. The action plan, schedule and September 1997 and October 1997 status reports have been formally issued and are included as a separate document with transmittal of this progress report.

ACRONYM LIST

AMT	Office of the Assistant Manager for Science and Technology (DOE-RL)
APR	Air-Purifying Respirator
BED	Building Emergency Director
BHI	Bechtel Hanford, Inc.
BWHC	B&W Hanford Company
CFR	Code of Federal Regulations
CMS	Chemical Management System
DESH	DE&S Hanford, Inc.
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy Headquarters
DOE-RL	U.S. Department of Energy Richland Operations Office
DST	Double Shell Tank
DTS	Deficiency Tracking System
DYN	DynCorp Tri-Cities Services, Inc.
EAL	Emergency Action Level
EM	Environmental Management (program)
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EP	Emergency Preparedness (program)
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
ER	Environmental Restoration (program)
ERAP	Emergency Readiness Assurance Plan
ERC	Environmental Restoration Contract
ES&H	Environment, Safety, and Health
FDH	Fluor Daniel Hanford, Inc.
FFTF	Fast Flux Test Facility
FEB	Facility Evaluation Board
FMEF	Fuels and Materials Examination Facility
FSAR	Facility Safety Analysis Report
FSS	Fuel Supply Shutdown
FY	Fiscal Year
HEHF	Hanford Environmental Health Foundation
HEPA	High-Efficiency Particulate Air
HFD	Hanford Fire Department
HMID	Hazardous Material Inventory Database
HN	Hydroxylamine Nitrate
HSRCM	Hanford Site Radiological Control Manual
HVAC	Heating, Ventilating, and Air Conditioning
IH	Industrial Hygiene
IMUST	Inactive Miscellaneous Underground Storage Tank
ISHMS	Integrated Environment, Safety, and Health Management System
ISMS	Integrated Environment, Safety, and Health Management System
JCO	Justification for Continued Operation

ACRONYMS (continued)

JIC	Joint Information Center
LMHC	Lockheed Martin Hanford Corporation
MSDS	Material Safety Data Sheet
NaK	Sodium-Potassium Alloy
NHC	Numatec Hanford Company
NIOSH	National Institute for Occupational Safety and Health
ORPS	Occurrence Reporting and Processing System (program)
PFP	Plutonium Finishing Plant
PHMC	Project Hanford Management Contract
PNNL	Pacific Northwest National Laboratory
POC	Point of Contact
PPE	Personal Protective Equipment
PPSL	Plutonium Process Support Laboratories
PRF	Plutonium Reclamation Facility
PRTR	Plutonium Recycle Test Reactor
PUREX	Plutonium Uranium Extraction (facility)
RAP	Radiological Assistance Program
RCRA	Resource Conservation and Recovery Act of 1976
RCT	Radiation Control Technician
REDOX	Reduction and Oxidation (facility)
SAR	Safety Analysis Report
SCBA	Self Contained Breathing Apparatus
SNM	Special Nuclear Material
SST	Single Shell Tank
SWITS	Solid Waste Information and Tracking System
TBP	Tributyl Phosphate
TPA	Tri-Party Agreement (Hanford Federal Facility Agreement and Consent Order)
TPQ	Threshold Planning Quantities
TWRS	Tank Waste Remediation System (organization and program)
UDAC	Unified Dose Assessment Center
USQ	Unreviewed Safety Question
WATS	Waste Acid Treatment System
WESF	Waste Encapsulation and Storage Facility
WHC	Westinghouse Hanford Company
WIDS	Waste Identification Data System
WMH	Waste Management Federal Services of Hanford, Inc.
WSCF	Waste Sampling and Characterization Facility

Table of Contents

Appendices

FIGURES

1.0 INTRODUCTION

On May 14, 1997, an unanticipated chemical reaction in Tank A-109 caused approximately 20 gallons of hydroxylamine nitrate and nitric acid stored in a 400 gallon storage tank to explode. This tank was located in the Plutonium Reclamation Facility (PRF), which is part of the Plutonium Finishing Plant (PFP). The PFP is located at the U.S. Department of Energy Richland Operations Office (DOE-RL) Hanford Site, Richland, Washington. Due to this incident and to studies within the U.S.Department of Energy (DOE) complex, it was realized that significant hazards may exist within inactive facilities and that these hazards are subject to change with time and the availability of personnel and funding. These studies indicate that long-term maintenance and the need for reduction of risks warrant additional attention throughout the complex. In addition, fundamental elements of the emergency response process require evaluation and improvement.

After the PRF incident, two DOE-RL accident review boards were convened. The boards investigated the events leading up to the explosion and the emergency response subsequent to the explosion. The boards issued the following reports:

- "Report on Emergency Response to the Event on May 14, 1997, at the Plutonium Reclamation Facility, Hanford Site, Richland, Washington," (DOE-RL, 1997a)

- "Accident Investigation Board Report on the May 14, 1997, Chemical Explosion at the Plutonium Reclamation Facility," (DOE-RL, 1997b)

Subsequently, Secretary of Energy Federico Peña issued the following DOE complex-wide corrective action initiatives:

- "DOE Response to the May 14, 1997, Explosion at Hanford's Plutonium Reclamation Facility," August 4, 1997 (DOE, 1997a).

- "Lessons Learned from the Emergency Response to the May 14, 1997, Explosion at Hanford's Plutonium Reclamation Facility," August 28, 1997 (DOE, 1997b).

- "Timely Notification of Emergencies and Significant Events," August 28, 1997, (DOE, 1997c).

- "Assessment of Hazards Associated with Chemical and Radioactive Waste Storage Tanks and Ancillary Equipment", October 21, 1997 (DOE, 1997d).

The Washington State Department of Ecology (Ecology) conducted an independent assessment that resulted in a notice of penalty and a notice of correction, received on September 16 and 17, 1997 (Ecology, 1997).

1.1 BACKGROUND

Four major prime contractors to DOE-RL provide operational management of the Hanford Site. The contractors are:

- Fluor Daniel Hanford, Inc. (FDH); lead organization for the Project Hanford Management Contract (PHMC) group of contractors
- Pacific Northwest National Laboratory
- Bechtel Hanford, Inc.; lead organization for the Environmental Restoration Contract group of contractors
- Hanford Environmental Health Foundation.

At the Hanford Site there is an overall flow-down of requirements, responsibilities, authorities, and accountability. DOE-RL implements strategic plans and missions according to the U.S.Department of Energy Headquarters (DOE-HQ) guidance, technical standards, and orders. DOE-RL interfaces with the Ecology and the Washington State Department of Health, and local organizations to ensure incorporation of required regulations and oversight and to ensure protection of the public. The requirements and directions are issued to prime contractors, who in turn, are responsible for direction and oversight of subcontractors. DOE-RL oversees the prime contractors and subcontractors**.**

After the May 14, 1997, PRF explosion, a series of actions were implemented to recover from the explosion and to minimize the risk of a similar event occurring at any other Hanford facility. FDH responded to the incident by establishing a dedicated project team to identify comprehensive process improvements and to develop specific corrective measures for the deficiencies identified in the two investigation reports. In coordination with DOE-RL this project effort was expanded to include all site prime contractors, with FDH providing project management and integration.

The project team developed a project schedule, an action plan, and a tracking system. The action plan, schedule, and first monthly status report were issued on October 21, 1997.

The project effort has been organized into five critical issue areas which became separate project teams as follows:

- Emergency Response
- Occupational Health
- Radiation Protection
- Training
- Chemical and Radiological Vulnerabilities.

In each area, the teams will provide a systematic approach to corrective measures and process improvements. Figure 1 illustrates the process flow for development of corrective measures. Figure 2 details the complexity and interrelationships in a project logic response for emergency related activities. Some teams have completed definition of objectives, completed gap analyses to determine specific corrective measures, and identified assessment needs. The planned actions are tracked on the project schedule.

Ecology the Washington State Department of Health, Benton County, and other local agencies and groups are participating in the project activities. DOE-RL, FDH, and Ecology staff are developing actions to respond to the Ecology notice of correction.

FDH and DynCorp Tri-Cities Services contracted with Excalibur Associates, Inc. to provide an independent assessment of the central emergency response organization and of the emergency response process. The DuPont Corporation was contracted to provide assessment and recommendations for management of chemicals, to review the process for emergency response to chemical incidents, and to review chemical inventories. Recommendations from assessments are being included in corrective measures.

1.2 PURPOSE AND SCOPE OF THIS REPORT

This progress report presents descriptions of completed activities and identification of planned measures, processes, and controls. The results of these activities will ensure that vulnerabilities from hazards are managed more effectively. The progress report summarizes a major effort to respond to current and future needs for the management and the reduction of risk at the Hanford Site. This report presents the 120-day milestone status of Hanford responses to deficiencies highlighted by the PRF incident. The report also responds to initiatives requested by the August 4, 1997 Memorandum from the Secretary of Energy (DOE, 1997a) relating to scrutinizing use of chemicals, evaluating chemical and radiological vulnerabilities, assessing technical competence of staff, and assessing lessons learned and occurrence reporting programs. In addition, this report provides status on initiatives from the two August 28, 1997 memoranda (DOE, 1997b and DOE, 1997c) and the October 21, 1997 memorandum (DOE, 1997d).

1.3 ORGANIZATION OF THIS REPORT

Section 1 provides background information and the scope of this report. Section 2 presents the status of assessment of chemical and radiological vulnerabilities, including actions taken and actions planned. Section 3 describes continuing activities and assessments, including the Tank Waste Remediation System tank activities the chemical management system and DOE-RL assessments and oversights. Section 4 addresses assessment of technical competence. Section 5 addresses status on response to the October 21, 1997 memorandum.

Section 6 addresses August 28, 1997 initiatives related to emergency response and notifications. Section 7 presents the references for this report. The appendices provide specific information regarding the vulnerability assessments of the PHMC sub-contractors to FDH and lessons learned and training.

Figure 1 PRF Incident Response Process

Figure 2 PRF Incident Response Logic

2.0 CHEMICAL AND RADIOLOGICAL VULNERABILITY ASSESSMENT OF FACILITIES

This section presents the response to the August 4, 1997, DOE direction (DOE, 1997a). The Plutonium Reclamation Facility (PRF) explosion revealed weaknesses in the identification of hazards and the management of materials. The prime contributing factor was a chemical vulnerability: lack of knowledge of the hazard and reactivity of the material stored in PRF.

DOE recognized the need to reevaluate safety systems used to control risks. Because safety systems are no better than the understanding of the hazards they are designed to control, the U.S. Department of Energy initiated a site-wide effort to review known hazards and to identify new ones. All site organizations with responsibilities for facilities were tasked to assess hazardous and reactive chemical inventories.

This section presents the three prime contractors approach to reassessment of their facilities for known and new vulnerabilities. It provides an overview of site-wide vulnerability assessments by the Project Hanford Management Contract (PHMC) team (led by Fluor Daniel Hanford, Inc. [FDH]), Pacific Northwest National Laboratory (PNNL), and Bechtel Hanford, Inc. (BHI). Approaches, evaluations, corrective actions, future needs, ongoing assessments, external assessments, and tracking are described. DOE-RL is actively involved in these vulnerability assessment activities.

2.1 PROJECT HANFORD MANAGEMENT CONTRACT TEAM

FDH manages the PHMC. FDH and its major subcontractors completed a review of vulnerabilities from reactive and hazardous chemicals in June 1997. This section addresses that review and follow-on corrective processes. Detailed response by FDH subcontractors is presented in the appendices (A through E).

2.1.1 Approach

Vulnerabilities are conditions or items that increase the risk to human health or the environment from management, handling, use, or storage of materials. An eight step process was used to evaluate chemical vulnerabilities at PHMC facilities. These steps include the following:

- immediate reassessment (the initial assessment) of potentially reactive chemicals at all facilities

- reidentification of primary vulnerabilities and review of vulnerabilities identified in the 1994 DOE Vulnerability Study (DOE, 1994)
- establishment of future priorities for facilities based upon vulnerabilities
- development of criteria for analysis of vulnerabilities
- testing of analysis criteria by subject-matter experts at selected facilities
- modification of analysis criteria based on results from testing
- application of vulnerability analysis criteria and of an analysis process to the other facilities
- development of corrective actions.

The initial assessment of chemical vulnerabilities is presented in Section 2.1.2. The other steps are presented in Section 2.1.3.

2.1.2 Evaluations of Chemical Inventories and Immediate Actions

Immediately after the PRF incident, FDH directed its major subcontractors to review chemicals and waste in storage to determine if any of these had the potential to become reactive or unstable under credible conditions. FDH commissioned a team of experts in the fields of chemistry, regulations, and facility process knowledge to evaluate the storage of hydroxylamine nitrate (HN) and other potentially reactive chemicals and to recommend actions to improve the control and the disposition of the material. The team of experts completed this task on June 19, 1997. Approximately 25 pounds of HN and 2 pounds of hydrazine were removed from the Hanford Site as a result of this review. FDH submitted the results from assessments to DOE-RL in the June 23, 1997, "Initial Facility Chemical Inventory Evaluation" (FDH, 1997a).

2.1.3 Future Actions and Criteria

After the June 23, 1997 assessment of the reactive chemical inventory, FDH management scheduled additional activities to verify data and chemical vulnerabilities. The PRF Incident Vulnerability Team was formed to identify additional vulnerabilities and minimize chemical and radiological vulnerabilities at FDH facilities. A management process for vulnerabilities was created to minimize chemical and radiological vulnerabilities at FDH facilities.

Before the vulnerabilities can be reduced, they need to be analyzed with respect to the adequacy of knowledge of the material, its hazards, and material management. PHMC organizations held a series of meetings to identify vulnerabilities. The FDH team reviewed the Hanford Site Hazardous Material Inventory Database (HMID). This database has been used to meet the Emergency Planning and Community Right-To-Know Act (EPCRA) reporting requirements. The database lists all EPCRA[1] materials stored at PHMC facilities. The data base is certified annually.

Based on this information, the PHMC team concluded that a major vulnerability for the site is the lack of understanding of hazards posed by materials maintained outside the original terms and scope of their use. This finding was consistent with those conclusions from the PRF incident. The PHMC team recognized that unknown materials are a vulnerability because one cannot understand the hazards of an unknown material.

The next two steps were to analyze facilities for new vulnerabilities and to identify corrective actions for problems found. Because of the large number of facilities at the Hanford Site, the PHMC team recognized that priorities had to be established for the facilities. Using the material hazards and the presence of unknown materials as ranking criteria, PHMC facilities were ranked based on the following four working criteria (meeting minutes August 21, 1997 [FDH, 1997b]):

- completeness of reported reactive chemical inventory
- quality of existing chemical management system
- facility configuration, i.e., lab, processing facility, and office
- potential for presence of unknown materials.

The PHMC Vulnerability Team began refining analysis criteria to identify chemical vulnerabilities. To assist in the development of these criteria, facility personnel were added to the team. The team developed questions that could be used to identify the primary vulnerability assessment criteria and help address the eight vulnerabilities previously identified (DOE, 1994).

The team concluded that a group of experienced individuals should apply the criteria to some of the highest priority facilities. This would test whether the criteria were complete and effective. The team was formed to include the following expertise:

- Chemical reactivity/explosives
- Hanford Site Conduct of Operations
- Industrial health and safety
- Radiological control
- Emergency preparedness.

The team selected the five highest risk facilities. The facilities selected were the 222 S Laboratory, the 324 facility, T Plant, 231-Z, and the 209E facility. The experts began performing

[1] EPCRA excludes reporting of some laboratory chemicals and consumer-packaged materials.

analyses of these facilities using the available criteria. The effort to review the five highest priority facilities is scheduled to be completed by December 31, 1997. After this initial review of five priority facilities, the team will modify the criteria to ensure effective identification of all chemical and radiological vulnerabilities. Facilities, such as high-level radioactive waste storage tanks, for which extensive efforts are already underway as part of current programs to address potential vulnerabilities, were not considered for selection at this stage. The Plutonium Finishing Plant (including PRF) was not selected due to the thorough review already underway (Appendix D).

After the criteria have been proven, they will be applied to identify chemical and radiological vulnerabilities at all facilities. PHMC organizations will then prepare recovery plans for reducing vulnerabilities. This activity has been estimated to run through the end of fiscal year (FY) 1998. Final schedules will not be available until vulnerability criteria are finalized and project baseline assessments (cost and schedule) are completed.

2.1.4 Continuing Activities and Assessments

The PHMC Integrated Environment, Safety, and Health Management System (ISMS) Plan (FDH, 1997c) establishes a single safety and environmental management system that includes environment, safety, and health (ES&H) requirements into the work planning and execution processes. The ISMS Plan requires hazard controls for facilities, based on knowledge of existing hazards and on an understanding of other job specific factors. Hazard sources typically are classified as follows:

- ionizing radiation from a criticality event
- ionizing radiation from specialized equipment and decay of radioactive material
- non-ionizing radiation
- chemical or pressure deflagration/explosion
- toxic materials, hazardous materials, hazardous wastes
- industrial and construction hazards
- structural failures (roofs and walkways)
- energy sources (mechanical, chemical, electrical, nuclear)
- biological sources
- fire and natural phenomena (high winds, dust, snow loads, tornadoes, floods, seismic motion, volcanic eruptions, extreme temperatures)
- contaminate discharges to air, water, and land.

Chemical hazards, and other hazards are identified in the work planning and safety

management processes. They are managed through routine completion of a job hazard analysis to establish effective work controls and to provide for the safe performance of work.

The ISMS Plan identifies a variety of mechanisms to assess and measure work performance in the presence of hazards. These mechanisms provide FDH and the major subcontractors with the information needed to evaluate worker and ISMS performance and to develop and implement improvements. Feedback and opportunities for continuous improvement are obtained through worker assessments, management assessments, independent assessments, occurrence-trending analysis, commitment tracking, analysis of causal factors, and inspections by external agencies.

2.1.5 PHMC Independent Assessments and Action Tracking

The FDH Quality Assurance group conducts independent technical assessments with the Facility Evaluation Board (FEB) at all nuclear and some non-nuclear facilities, and independent program assessments of PHMC support activities. The FEB has critiqued an emergency exercise and has been added to the evaluation chain for future exercises. PHMC organizations also develop corrective actions resulting from periodic management assessments of the adequacy of implementation of the management processes and of PRF corrective actions.

Corrective actions will include adding prioritized assessments to the 1998 performance assessment schedules, expanding performance and objective criteria, and performing critiques of drills. The functional areas currently being reviewed are emergency management, operations, training and qualification, radiation protection, nuclear safety, environmental protection, and occupational safety and health. Additional independent assessments have been scheduled to begin in December 1997. These will address notification, medical evaluation, “take cover” processes, training, and lessons learned.

Corrective actions are being entered and tracked in the site-wide Deficiency Tracking System (DTS) by FDH. The status of deficiencies and associated corrective actions are being reported and tracked to completion. The DTS has the capability to create action requests to resolve deficiencies, to assign actions to resolve identified deficiencies, to track assignments through completion, to index oversight reporting documents, and to link documents with their associated action requests.

2.2 PACIFIC NORTHWEST NATIONAL LABORATORY

The PNNL vulnerability assessment was conducted as described in the following section.

2.2.1 Approach

As a result of a number of initiatives, PNNL has performed many chemical and radiological vulnerability review and management activities in the last several years. Efforts in

this area are continuing with actions planned for future years. The results achieved through these efforts include elimination of significant amounts of legacy material, closures and cleaning out of approximately 40 percent of the PNNL inventory of facilities, and consolidation of active radiological operations from 24 facilities to 15 facilities. Numerous process and management improvements have been achieved, such as the establishment and implementation of the ISMS.

With the oversight, direction, and partnership of the DOE-RL Office of the Assistant Manager for Science and Technology (AMT), PNNL is proceeding on a priority based path to eliminate and to prevent reoccurrence of chemical and radiological legacies, and to improve chemical and radiological management.

In addition to these planned and ongoing activities, PNNL has initiated activities specifically in response to the PRF accident. PNNL reached the following conclusion by the vulnerability assessment:

- No significant deficiencies were found with the PNNL chemical management system.
- There is no indication that any tanks under PNNL control have unknown, hazardous chemicals.
- There were no conditions found with respect to hazardous chemical inventories that merited immediate corrective action.

These results were communicated to DOE-RL (PNNL, 1997a; PNNL, 1997b).

2.2.2 Chemical, Radiological, and Legacy Inventory Evaluations and Actions

Over that last several years a number of initiatives have resulted in extensive review and vulnerability management activities at PNNL. These include:

- Operations Improvement Program FY 1995-1997
- Facility Transition Project FY 1996-1997
- Brookhaven response reviews FY 1997
- PRF response reviews FY 1997-1998
- Legacy Transition Project Initiated September 1997

Specific accomplishments from these initiatives included the following:

- Located environmental compliance representatives and field service representatives in the field with waste generators and line organizations in FY 1996.
- Initiated monthly field walkdowns by the Environmental Management Division in FY 1996.
- Initiated weekly walkdowns of satellite accumulation areas in FY 1996.

- Conducted a PNNL tank survey and inventory FY 1996, with 345 tanks reviewed during facility walkdowns.

- Conducted multi-disciplinary, 325 Building safety analysis report implementation walkdowns in FY 1996.

- Removed 81 of 201 facilities from PNNL's active facility inventory, using a rigorous process to assure that the facilities were shut down in a controlled, compliant, and safe manner (PNNL, 1997c). During this transition process, more than 1,500 hazardous items and 112 tons of radioactive waste were removed. Extensive field verification of the shut down activities were conducted by DOE-RL-AMT.

- Reduced fire potential by taking more than 34 semi-loads of combustible material to excess.

- Consolidated active radiological operations from 24 facilities to 15 facilities.

- Disposed of 12 special nuclear material items (plutonium, depleted uranium etc.).

- Initiated tracking of chemicals with identified threshold planning quantity (TPQs) values with the chemical management system to ensure that inventories do not exceed the TPQs.

- Conducted extensive assessment activities as a result of Brookhaven National Laboratory Lessons Learned, in response to DOE-RL-AMT (PNNL, 1997d; PNNL, 1997e).

- Requested and received a one-week assessment of waste management by DOE-RL and the Kennewick Office of the Washington State Department of Ecology (Ecology), with field walkdowns in September 1997.

- Requested and received a one-week assessment of waste management by the Yakima Office of Washington State Department of Ecology, with field walkdowns in October 1997.

- Reviewed elements of the chemical management program against 1994 Chemical Vulnerabilities Report (PNNL, 1997a). The review included eight vulnerability issues identified in the report, which encompass the three Hanford Site issues identified in Field Verification Report Hanford Site (DOE, 1994).

- Conducted line organization self assessments on implementation of chemical management requirements, procedures, and guidelines in October 1997.

2.2.3 Future Actions and Criteria

PNNL has aggressively managed issues by identifying and resolving waste, contamination,

and facility legacies. As the next step, the Legacy Transition Project is being initiated to identify, characterize, and ultimately remedy remaining un-addressed legacy waste and contamination issues at PNNL facilities and sites. This will extend the aggressive management of legacy issues to a greater depth, and will encompass the lower level of detail that is necessary to identify and to manage issues that are currently not a regulatory or business problem, but may be in the future. By proactive management of these potential issues, DOE-RL-AMT and PNNL will provide the most appropriate management of the issues at the least cost to the government.

The specific scope of the project will include conducting a thorough assessment of PNNL facilities and areas for legacy issues, with extensive field walkdowns planned of 122 facilities and sites during FY 1998-1999. The criterion used to select these sites was the screening performed by previous assessments that identified a potential legacy at the facility or site. The resulting list was ranked in priority of potential chemical and radiological vulnerability. Concerns that are identified will be documented, and resolved in priority order. A number of concerns have been identified, reviewed with DOE-RL-AMT, and actions were initiated as appropriate. These actions will be tracked with the other site contractors' corrective actions.

2.2.4 Continuing Activities and Assessments

PNNL is supporting the current site efforts and will continue to team with the other contractors in the improvement initiatives and remediation activities.

PNNL will continue to conduct surveillance and maintenance on the facilities that remain in standby condition until the facilities are transferred to the site contractors that specialize in facility deactivation, surveillance and maintenance, and final disposition. PNNL continues to support the activities necessary to transfer the excess DOE-RL Energy Research Program facilities.

The Hanford Excess Facility Management Plan (DOE-RL, 1996) provides an expedient and cost-effective, risk-based process for managing excess facilities. The plan provides for the following goals:

- Achieve an overall reduction in hazards from excess facilities and from associated risks to the public, the workers, and the environment
- Achieve an overall reduction in costs for excess facility operation and transition to the most appropriate contractor for surveillance and maintenance and/or final disposition
- Accelerate progress toward reuse of excess facilities, removal, or transition to surveillance and maintenance
- Facilitate well defined projects that can be planned, managed, integrated, and completed using conventional project management techniques

This process has not been fully implemented due to higher funding priorities. PNNL has

supported the site efforts in the development of this plan, and will support implementation of the plan on a site-wide basis as resources become available.

Other efforts to eliminate legacies includes the modification of the liquid waste systems in PNNL facilities. This will allow the shut down and ultimate removal of the legacies associated with the current disposal path for the Radioactive Liquid Waste System in the 300 Area.

2.2.5 Integrated Safety Management System

PNNL has implemented the integrated environment, safety, and health management system (PNNL, 1997f). This plan assures that work is accomplished in a safe and environmentally sound manner, achieving "defense in depth" through the careful application of work controls. The system is structured around the following guiding principles, relating to the line manager being clearly responsible for ES&H, as follows:

- Clear ES&H roles and responsibilities
- Competence commensurate with responsibilities
- Balanced ES&H priorities
- Identified ES&H standards and requirements
- Hazard controls tailored to work scope
- Operations authorization of activities

2.3 BECHTEL HANFORD, INC.

The BHI vulnerability assessment followed the same integrated site-wide approach as described in Sections 2.1 and 2.2.

2.3.1 Approach

As requested by DOE-RL (DOE-RL, 1997c), BHI formed a technical review team to evaluate facility chemical inventory information to identify the presence of potentially reactive or unstable chemicals in Environmental Restoration (ER) program facilities. The report, documenting the results of that effort was submitted to DOE-RL on June 6, 1997 (BHI, 1997a).

2.3.2 Chemical, Radiological, and Legacy Inventory Evaluations and Actions

The Preliminary Facility Chemical Inventory Evaluation report (BHI, 1997a) concluded that no hazardous reactive or unstable chemicals were identified in any of the ER program facilities. The report noted there are tanks in certain ER program facilities, including the Reduction and Oxidation Facility (REDOX) and U Plant, whose contents have not been positively established by analytical data but rather by process knowledge and shutdown/deactivation information and records. While these tanks are not suspected to contain unstable or reactive chemicals, sample data to verify that conclusion is not generally available. These facilities are unoccupied and accessed on a limited basis to conduct surveillances.

The BHI technical review team, that conducted the initial chemical inventory evaluation, also reviewed the Chemical Safety Vulnerability Working Group Report (DOE, 1994). The report from the team did not identify any immediate chemical vulnerability similar to those reactive chemicals at the Plutonium Reclamation Facility (PRF).

To verify the conclusions of the BHI team report, BHI obtained an independent review of that report. The review concluded that the survey performed by BHI was adequate to confirm that the risk is low for an accident, such as the one in PRF, to occur in ER program facilities.

2.3.3 Future Actions and Criteria

Based on the reviews, BHI identified vulnerabilities in five of the eight areas contained in the chemical safety vulnerability report. Each vulnerability, action, and status is addressed below:

Chemical Vulnerability

Characterization:

Additional characterization of legacy chemicals presently identified in BHI ER managed facilities. As contained in the BHI FY 1998 Detailed Work Plan (DOE-RL, 1997d), BHI will prepare a data quality objective type assessment of legacy chemicals in BHI managed facilities to determine if risks merit additional characterization.

Chemical Storage:

Accelerated remediation of sludge in the Hexone Tanks at the REDOX plant. Presently an inert cover gas is maintained in the two tanks. Additional testing is underway to determine if the Hexone Tanks can be isolated and the cover of inert gas terminated.

Chemical Residues:

Unreactive residues of chemicals identified in the 163N Demineralization Plant will be dispositioned in accordance with the BHI FY 1998 Detailed Work Plan (DOE-RL, 1997d).

Facility Conditions:

Update WHC-EP-0619, "Risk Management Study for Retired Hanford Facilities," (WHC, 1994a) and BHI-00066, "Hanford Surplus Facilities Hazard Identification Document," (BHI, 1997b). This revision will begin in December 1997 and continue to be used as the engineering and project baseline for determining priority of risk reduction in surplus ER facilities.

In 1993, a risk evaluation of the 100 and 200 Area retired, surplus facilities on the Hanford Site (WHC, 1994a) was conducted to assess the known vulnerabilities and to formulate a prioritized response to mitigate these hazards. This activity generated data that were compiled by a risk evaluation team during their investigation and then were analyzed to produce qualitative information that characterized these risks. Of the hazards identified, falling potentials, electrical shock, and, to a smaller degree, radiation exposure were most significant. The update will include any new hazards (including chemical, if appropriate) and the priority of work will be established by using the risk criteria.

Inventory Control

BHI is evaluating alternative methods for control of unused chemical product, identified in Environmental Restoration Contract managed facilities. Final methods will be based on the site-wide systems requirement document for management of chemical systems and the associated BHI assessment of needs.

The following information relates to the 22 inactive miscellaneous underground storage tanks (IMUSTs) presently assigned to management under BHI. Transfer of the 244-UR Vault, that contains the TK-UR-001, TK-UR-002, TK-UR-003, and TK-UR-004 tanks, from BHI to Lockheed Martin Hanford Corporation (LMHC) should be accelerated, per the Memorandum of Agreement (MOA) between Tank Waste Remediation Systems (TWRS) and BHI ER serial number 049413, (LMHC, 1997). BHI and LMHC conducted a joint walkdown of this vault and established a checklist of transfer end-points. Until the successful completion of the transfer, BHI continues to perform visual observations from outside the U Tank Farms fence and LMHC is performing surface surveillances from within the U Tank Farms.

Using the joint strategy plan for the Hanford Site (WHC, 1994b) and the engineering study (WHC, 1994c) as the reference documents, it is planned to extract the ERC inactive miscellaneous underground storage tank (IMUST) data and issue a management plan for these tanks. This will be funded by the BHI FY 1998 Detailed Work Plan, which is scheduled to be complete December 31, 1997.

2.3.4 Continuing Activities and Assessments

A chemical management system (CMS) working group was formed as part of a commitment from the four Hanford Site prime contractors to coordinate and work jointly in developing and implementing a site-wide system. A crucial objective to establishing a CMS is the development of requirements that incorporate best industry standards. These requirements will become the expectations that will drive a coordinated site-wide management of chemicals. The working group is on schedule to meet the November 1997 approval date for this document.

To ensure the implementation of the BHI CMS commitments, the BHI Compliance and Quality Programs group will conduct a focused assessment of functional and project self-assessment programs. This assessment will verify that the self-assessment programs adequately evaluate the implementation of the CMS and the incorporation of CMS requirements into procedures and subcontracts.

2.3.5 Integrated Safety Management System

BHI will be developing an ISMS Plan, pending a contract modification. The BHI ISMS will be compatible with the PHMC ISMS Plan, that was approved by DOE-RL on September 25, 1997. The BHI ISMS Plan will be the cornerstone for conducting day-to-day work activities on BHI projects and also provide long term corrective actions for the Secretarial Initiatives and for Judgements of Needs from the PRF incident.

3.0 CONTINUING SITE-WIDE ACTIVITIES AND ASSESSMENTS

3.1 TANK WASTE REMEDIATION SYSTEM AND INACTIVE MISCELLANEOUS UNDERGROUND STORAGE TANKS

Immediately after the Plutonium Reclamation Facility (PRF) incident, the Lockheed Martin Hanford Corporation (LMHC) Area engineering groups for the Tank Waste Remediation System (TWRS) 200 Area East Tank Farms and the 200 Area West Tank Farms performed vulnerability assessments. These assessments focused on rapid identification and review of potential chemical vulnerabilities.

The initial vulnerability study for East Tank Farms (LMHC, 1997a) noted that the double shell tanks (DSTs), single shell tanks (SSTs), and inactive miscellaneous underground storage tanks (IMUSTs) are included in the authorization basis and have appropriate controls. These controls include isolation and prohibitions for entry to IMUSTs without adequate characterization. The study then focused on the completion of walkdowns and inventories of the 204-AR Waste Unloading Facility, the 244-AR Sludge Vault Storage and Processing Facility, the 209-E Tank Farm Waste Support Facility, the Grout Facility, and the 241-AX Farm Ion-Exchange Column. Some walkdowns identified the need for additional evaluation.

The initial vulnerability study for West Tank Farms (LMHC, 1997b) similarly noted that appropriate controls were in place for the DSTs, SSTs, and IMUSTs. The study then focused on chemical inventories and vulnerabilities for the 2727-W Building (sodium storage), the 242-T Evaporator and 241-T-601 support building, the 242-S Evaporator, and the 241-BY tank farm chemical storage tanks. Certain tanks in the evaporators have been scheduled for additional evaluation.

Future actions in the tank farms are aimed at systematic review and refinement of systems, structures, and component, that have the potential for chemical vulnerability.

The October 21, 1997, Secretarial memorandum (DOE, 1997d) directed "...field offices to ensure that all waste storage tanks are identified, fully characterized, and addressed in the November status reports." The DOE-RL is assessing the feasibility, timing, and cost of responding to this request. Project plans and schedules may lead to a substantial increase in costs. DOE-RL is examining the remediation schedules, potential risks from the tanks, and cost to fully characterize the tanks, ancillary piping, and equipment. This information will be used to define a plan.

3.1.1 Introduction

Hanford tanks are managed by three contractors: Waste Management Federal Services of Hanford, Inc. (WMH), B&W Hanford Company (BWHC), Bechtel Hanford, Inc. (BHI), and LMHC. LMHC has the largest number of large tanks containing high level radioactive waste. In the Hanford 200 East and 200 West areas, the TWRS group is conducting a systematic program to identify facilities, tanks, and other components that may pose some degree of chemical

vulnerability or that may have been missing or inadequately addressed in the documentation for the authorization basis.

A majority of the 54 million gallons of high-level radioactive liquid waste stored at Hanford is stored in the 177 single-shell and double-shell tanks operated by the LMHC TWRS group. The tank waste characterization project has the responsibility for obtaining very difficult to collect tank waste data to use for safe operation, storage, transfer, retrieval, pretreatment, immobilization, and disposal of the waste (WHC, 1996). The project performs liquid, vapor, and core sampling and analyses. The project also manages the tank waste characterization data and databases, including providing the best estimates of tank contents based on historical information, modeling, and actual analytical data. The tank waste characterization project is scheduled to be completed in 2004. Over recent years the TWRS program has placed special interest on monitoring the accumulation of potentially explosive gases, such as hydrogen. These concerns are addressed in TWRS safety basis documents and by scheduled activities.

The following sections describe TWRS activities related to IMUSTs. WHM activities are presented in Appendix A and BWHC activities are presented in Appendix D. BHI activities are presented in Section 2.3.

3.1.2 Categories and Definitions

The TWRS program recognizes three categories of facilities, for purposes of systematic identification of chemical vulnerabilities and inadequacies in the authorization basis, as follows:

- Orphan Facilities: These are larger identifiable facilities that are either not addressed or inadequately addressed in the authorization basis. The orphan facilities may contain “IMUSTs” or “non-IMUSTs.”

- IMUSTs: The key characteristics of IMUSTs are inactive, underground, and radioactive.

- Non-IMUSTs: This category includes tanks or other major components that might contain material of concern. For example, this category includes inactive, above-ground tanks containing radioactive material, or inactive tanks containing non-radioactive material. Vessels of concern solely due to chemical vulnerability would fall into this category.

3.1.3 Requirements

The primary requirements for assessments at TWRS consist of the need for an increased level of assurance that all chemical vulnerabilities are identified and addressed in the safety authorization basis. Closure of flammable gas unreviewed safety questions and identification of new hazards from adjacent facilities, that may have been overlooked in the authorization basis, are concerns.

3.1.4 Current Status and Methodology

An engineering study of 50 IMUSTs (WHC, 1994c) that included tank descriptions and process history was issued. An update that added data on 13 additional tanks was subsequently issued (WHC, 1995). The Hanford Site Waste Identification Data System (WIDS) database was updated (DOE-RL, 1997e) to clarify responsibility for all identifiable facilities containing waste. The responsibilities for IMUSTs in the Hanford 200 Area are as follows:

DOE Division	Contractor	Number of Tanks
Waste Programs	WMH	2
Transition Programs	BWHC	2
Environmental Restoration (ER)	BHI	22
Waste Storage (TWRS)	LMHC	38
Total Hanford 200 Area IMUSTs		64

DOE (DOE-RL, 1997f) exchanged responsibilities for some tanks between Environmental Restoration and TWRS organizations. The net effect of this transfer will be one additional IMUST for TWRS and one less IMUST for ER.

The confirmation of acceptance for responsibility of each IMUST is an ongoing process. Process histories are available for most of the tanks; these will be reviewed and confirmed. The few that are not available will be completed. Field identification and postings have been completed, but will be confirmed. It is expected that the process histories for the TWRS IMUSTs will enable confirmation that they contain wastes typical of the Hanford SSTs and DSTs. The TWRS group will use the Organic Safety Issue Resolution Program to verify that a self-initiated, runaway chemical reaction cannot occur. For other TWRS IMUSTs, process histories will be reviewed in Fiscal Year (FY) 1998 to identify those with chemical vulnerabilities. Updating of the authorization basis will follow, if necessary.

Agreement was reached between Fluor Daniel Hanford, Inc. (FDH) (FDH, 1997f) and DOE-RL on an approach to be used for incorporating the IMUSTs into the SST closure work

plan. It is anticipated that waste will be retrieved from IMUSTs. Interim surveillance and maintenance of IMUSTs and inactive ancillary equipment will continue.

3.2 CHEMICAL MANAGEMENT SYSTEM

A site-wide system to manage chemicals is needed to ensure effective management of chemicals and their hazards. The planned system will manage and track chemical use through requisition, procurement, use, and disposition.

3.2.1 Strategy

On August 26, 1997, the prime contractors (BHI, Hanford Environmental Health Foundation [HEHF], FDH, and Pacific Northwest National Laboratory [PNNL]) submitted a letter to DOE-RL stating their commitment to create a joint plan-of-action for management of chemicals on the Hanford Site. A multi-contractor chemical management system (CMS) working group was formed and a strategy for chemical management was developed. On October 14, 1997, the working group made a joint presentation to DOE-RL regarding strategies and methods for integrating chemical management systems.

As part of the strategies, the working group will develop requirements for a coordinated CMS. DuPont Corporation is providing expertise in developing these requirements. DuPont's services have been procured through DOE's membership in the Chemical Manufacturer's Responsible Care Initiative. The prime contractors will use these requirements to evaluate the adequacy of their programs, to identify opportunities for improvement, to implement changes, and to implement the day-to-day management of chemicals. Development and implementation of the CMS requirements by the prime contractors will provide coordinated, consistent chemical management. It will provide an architecture for protection of human health and the environment. The CMS requirements will incorporate industry best practices, require continuous improvement, and be incorporated into the IMUSTs of the prime contractors. The implementation logic is:

- Define and document requirements for a CMS
- Approval by BHI, HEHF, FDH, and PNNL
- Performance of the following (each prime contractor):
  - Gap identification involving a company assessment versus the CMS requirements
  - Evaluation of the gaps
  - Preparation of a corrective action implementation plan

- Implementation of the plan.

3.2.2 Planned Actions

Approval by the prime contractors of the CMS requirements is scheduled for November 28, 1997. The following actions and target schedules are planned for implementation by each contractor after completion of the CMS requirements.

BHI and PNNL are scheduled to perform gap analyses by January 16, 1998. Assessment of needs is scheduled for completion by them by February 13, 1998. An implementation plan is scheduled to be written by April 17, 1998. The plans are scheduled to be implemented by September 30, 1998.

The PHMC team is scheduled to develop a CMS program plan by February 27, 1998. The program plan will include the gap analysis and the assessment of needs. An implementation plan is scheduled to be written by May 29, 1998. Actual commitment dates will be established by FDH project directors, major subcontractors, and DOE-RL assistant managers.

The PHMC team is performing an analysis of CMS software systems consistent with recommendations made in the FY 1997 Performance Agreement SM5.8.2, “Evaluation and recommendations for upgrading the chemical procurement system” (FDH, 1997d). The CMS analysis of software will enhance management of chemicals.

The CMS software identification of needs was completed. The evaluation of current CMS software systems is scheduled for completion by December 2, 1997. The CMS software gap analysis is scheduled for completion by the end of December 1997. The final recommendations for CMS software is scheduled for completion by April 14, 1998.

3.3 DOE-RL ASSESSMENTS AND OVERSIGHTS

This section addresses DOE-RL action items that were identified in the initiatives (DOE, 1997a; 1997b; and 1997c).

DOE-RL is reviewing and verifying contractor efforts involved with assessing chemical and radiological vulnerabilities at Hanford facilities and developing corrective actions. This includes: 1) the extensive recovery efforts and comprehensive hazards and vulnerability assessments at the Plutonium Finishing Plant (PFP) complex; 2) the verification of initial vulnerability evaluations performed site-wide by all contractors in response to the safety alert;

and 3) the more detailed vulnerability assessments undertaken subsequent to the Secretarial Initiatives of August 4, 1997 (DOE, 1997a). A summary of the DOE-RL oversight follows in subsequent sections.

3.3.1 Plutonium Finishing Plant and Plutonium Reclamation Facility

Documentation of an initial review of the PFP chemical inventory was issued on June 16, 1997. The review identified two immediate hazards: a line within PRF filled with about one gallon hydroxylamine nitrate and nitric acid, and a five gallon waste container containing hydroxylamine nitrate (HN) in a hazardous waste 90-day-storage area. Mitigative actions were taken immediately. The PRF line was sampled, analyzed, and drained. Analytical results showed only trace amounts of hydroxylamine in dilute nitric acid. It is awaiting shipment. The five-gallon container has been shipped to an off-site vendor.

Access has not been possible to all equipment, ductwork, and facilities within the PFP complex, which has precluded complete analysis of the chemicals present. However, sufficient information and process knowledge is available to indicate that no immediate hazard to the public, environment, or employees exists.

Certain chemical and radiological hazards, which require characterization and mitigation, were identified in PFP facilities. Several of the characterization actions have been completed, and mitigation actions are underway.

The assessment found one hazard that requires additional characterization to ascertain its risk. A settling tank (241-Z-361) was identified that contains hydrogen gas and between 28 and 75 kilograms of plutonium. DOE-RL has been involved in the review and evaluation of this hazard through all stages, from screening and analysis through final declaration as an unreviewed safety question. Access restrictions and other controls have been put in place. Intermediate goals are to sample the head space of the tank and to obtain videos. Characterization is planned and partially funded in FY 1998. Additional funding is being sought.

The amount and variety of chemicals in laboratory and process areas are extensive. The inventory of supply chemicals has been well-characterized, and a current inventory is maintained through the Hanford Hazardous Material Inventory Database (HMID). The PFP analytical laboratories have a well-controlled inventory system for both supply chemicals and hood/glovebox areas. Wastes are handled in accordance with procedures and regulations. Most issues were found in inactive process and support areas.

The assessments covering the entire scope of the PFP complex have not identified additional hazards of explosions. Recommended actions to manage chemical hazards at PFP include:

- completing the characterization and mitigation of identified chemical hazards in a timely manner
- minimizing the PFP stored inventory of chemicals
- draining and flushing of inactive tanks, vessels, and lines as part of facility deactivation
- assuring that all hazardous chemicals found in process areas during the recent assessment are added to the HMID database
- Incorporating awareness of the changing nature of chemical hazards into the PFP safety management system.

With regard to the PRF building, work continues in support of recovery activities and is tracked on a recovery action schedule. A comprehensive hazards analysis was completed and was approved by DOE-RL in October 1997. Air sampling, completing a full chemical inventory of the room where the chemical explosion occurred, and draining/flushing of the tank that exploded were completed earlier. Continuous air monitoring systems and the critically alarm systems, that will reduce personal protective equipment needs and allow increased work activity, were restored in November 1997. A near-term milestone was established for structural evaluation of the roof for potential snow-loads.

3.3.2 Initial Vulnerability Evaluations

After the safety alert (DOE, 1997f) issued by DOE Office of Environment, Safety, and Health as a result of the explosion at PRF, DOE-RL required each contractor to perform a chemical inventory of each facility to identify vulnerabilities resulting from the presence of dangerous chemicals, or materials that could introduce a hazard through changes in physical or chemical properties, that require immediate consideration and corrective action. DOE-RL asked that this review consist of records examination, process history evaluation, confirmatory facility walkdowns, and sampling where appropriate.

DOE-RL is continuing independent review and verification of the contractor's assessments. The following examples are representative of the effort.

- DOE-RL has performed verifications at several TWRS facilities, including the inactive Critical Mass Laboratory, the Grout facility, two evaporator facilities, and the In-Tank Solidification Units at BY tank farms. The scope of review covers tanks, waste transfer systems, IMUSTs, cribs, ponds, ditches, and other units associated with the TWRS facilities. The TWRS group has identified several areas where evaluation efforts should be strengthened or where additional characterization is needed. At the Critical Mass Laboratory, there are several tanks that contain plutonium nitrate heels from past experiments. Considering the potential for hydrogen gas generation in the tanks, DOE-RL has declared an unreviewed safety question and established interim controls on the tanks and the

facility.

- At each transition facility, e.g., B Plant/Waste Encapsulation and Storage Facility (WESF), Plutonium Uranium Extraction (PUREX), facilities 324/327, DOE-RL is reviewing and verifying completed actions as part of cleanup and deactivation to remove chemicals that are no longer actively used, flushing all of the vessels, verifying that the vessels are empty, and sampling all chemical tank heels. For example, at B Plant, most of the nitric acid has been removed; all bulk chemicals have been excessed or dispositioned; 40,000 gallons of stored chemicals have been removed; and all inactive "cold side" chemical tanks have been emptied, flushed, isolated, and verified to be empty. The plant is scheduled to sample and to dispose of liquids present in the remaining inactive tanks. The process history of these tanks indicates the liquids do not pose fire, explosion, or reactivity hazards. Details have been documented. DOE-RL has initiated additional walkthroughs at the transition facilities.

- DOE-RL has verified the contractor's vulnerability assessment efforts at the 222 S Laboratory complex and the Waste Sampling and Characterization Facility (WSCF), based on a chemist's analysis of chemical inventories and walkdown of buildings and areas. Two 500-milliliter bottles of HN were found, reacted, and dispositioned. Seven potentially reactive chemicals were found in the inventory but were properly stored. DOE-RL staff performed inspections of the majority of satellite accumulation areas in the 222 S complex, including the Standards Laboratory. One inspection resulted in identification of 150 milliliters of 4 percent HN awaiting disposal as waste. Contractor records indicated that the item should have been there, but had been missed in the initial search. The contractor took immediate and appropriate corrective action.

- DOE-RL, through its primary ER contractor BHI, obtained an independent review of the vulnerability assessments performed for the ER facilities. The review was performed by a chemist who had 38 years experience at a major DOE site and who participated in the 1994 DOE complex-wide assessments of chemical vulnerabilities. The review concluded that the vulnerability assessment was adequate to confirm that the risk of an accident, such as the one at PRF, was unlikely at an ER facility.

DOE-RL has gained several insights from the verification efforts. These include the following:

- Vulnerability assessments require greater emphasis on unknown systems.

- The review and verification team should include a safety analyst, a manager, a chemist, a health physicist, a facility representative, and personnel familiar with the facility's authorization basis to identify potential discrepancies and risks.

3.3.3 More Detailed Vulnerability Assessments

DOE-RL's ongoing verification efforts are being supplemented by participation in the PHMC's more detailed vulnerability assessments. DOE-RL is participating in the pilot assessments at five high-priority facilities. DOE-RL will conduct additional verifications by facility inspections and by using criteria that will be developed from the ongoing analysis and that will be uniformly applied across the site. Facilities already examined by DOE-RL or those subject to ongoing established programs to address vulnerability issues are not expected to be reexamined.

As facilities are evaluated, the resulting corrective actions (including improvements to the lessons learned and training programs) will be incorporated into a comprehensive action tracking system. DOE-RL has tasked the management and integration contractor, FDH, to lead the integration of corrective measures for all the site contractors. DOE-RL will provide guidance and oversight for prioritizing the corrective actions and will verify that commitments are fully met.

DOE-RL will ensure that actions undertaken in response to the vulnerability assessments become part of a continuous process by incorporation into the Hanford's Integrated Environment, Safety, and Health Management System (ISMS) Plan and the site-wide CMS. The ISMS Plan is periodically reviewed by the ES&H Executive Council. The ES&H Executive Council will address results of independent assessments, by DOE-RL and the PHMC Facility Evaluation Board, and will determine needed improvements.

3.3.4 Reporting and Processing System and Occurrence Reporting Assessment

The DOE-RL Performance Assessment Division is chartered to assess the site lessons learned program. An assessment of the lessons learned program is planned. The assessment will ensure that outgoing information is well characterized and properly summarized, and that incoming information is thoroughly evaluated, properly disseminated, appropriately implemented, and tracked through a formal management process. This assessment will also ensure that the program effectiveness is periodically measured. The assessment team will focus on the following:

- compliance with the process described in DOE-STD-7501-95 (DOE, 1995), as determined by requirements set forth in the DOE lessons learned program

- training and qualification of personnel who participate in the dissemination of lessons learned information as set forth in DOE-STD-7501-95 (DOE, 1995)

- assurance that valid and timely lessons learned information is captured and summarized by the appropriate point-of-contact or designee

- assurance that the DOE Lessons Learned Implementation Plan is fully implemented

- assurance that the site lessons learned program is effective, efficient, and demonstrates continuous improvement

The field work for this assessment will be conducted between November 19 and 21, 1997. A final report will be completed by December 10, 1997.

The occurrence reporting and processing system (ORPS) is assessed on a facility basis in accordance with the Conduct of Operations Master Assessment Plan for Hanford and DOE orders. Quality of ORPS reporting is important to Hanford. To this end, DOE ORPS program manager, the DOE facility representatives, and the Hanford Occurrence Notification Center staff and the writers of individual facility occurrence reports work together to continually improve occurrence report quality. The self assessments have not identified any major programmatic problem.

4.0 ASSESSING TECHNICAL COMPETENCE

The actions of this Secretarial Initiative (DOE, 1997a) will assure the technical knowledge with respect to the full range of radiological and chemical hazards and competence of personnel controlling and supporting facilities with hazards. These personnel have been classified as operational management and staff, technical support for process engineering, and support for authorization bases. A team comprised of Project Hanford Management Contract (PHMC), Bechtel Hanford, Inc. (BHI), Pacific Northwest National Laboratory (PNNL), and the U.S. Department of Energy Richland Operations Office (DOE-RL) personnel was established to address this issue. The PHMC has an approved Integrated Environment, Safety, and Health Management System (ISMS) Plan that addresses technical competence. The principles of the system include line management responsibility for safety and environmental performance, a clear definition of roles and responsibilities, competence commensurate with responsibilities, and balanced priorities.

4.1 PROJECT HANFORD MANAGEMENT CONTRACT TRAINING

The ISMS Plan has qualification requirements to assure that personnel performing hazard identification and analysis and development of controls are educated, trained, and experienced according to the Fluor Daniel Hanford, Inc. (FDH) Qualification and Training Plan (FDH, 1997e) to perform the tasks safely, completely, and effectively. The training plan is being revised to include the comprehensive requirements established within the ISMS Plan.

4.2 PACIFIC NORTHWEST NATIONAL LABORATORY TRAINING

PNNL established an Operations Improvement Program in 1994 that included rethinking the management systems, line management responsibility for safety and environmental performance, and clear definition of roles, responsibilities, authorities, and accountabilities. This effort included the development of a training and qualification management system, and implementing subject areas which assist the line managers in identifying prerequisite staff training and qualification requirements. The training and qualification subject areas establish core staff competence standards, and associated specific training and qualification standards are defined within each specific subject area, i.e., working with chemicals, lock and tag, and working with lasers.

4.3 BECHTEL HANFORD, INC. TRAINING

BHI as the Environmental Restoration Contractor at Hanford has responsibility for surveillance and maintenance, remedial action, and decommissioning of surplus facilities. Personnel assigned to the project are trained and qualified to recognize hazards based on their specific trade, i.e., electrician, operators, RadCon technicians, etc., or engineering discipline. BHI retained the personnel expertise for these facilities and waste sites at time of contract change. This expertise, in the way of qualified personnel, includes the engineers, field engineers, operations and craft personnel who have been doing this work for 10 to 15 years and have specific knowledge on the facility baseline hazards.

The baseline hazards for the facilities are documented in BHI-00066 "Hazards Identification Document" (BHI 1997b). The input (hazards identification) was provided by qualified craft and engineers most knowledgeable of the facility. When a facility and/or waste site moves from the surveillance and maintenance phase to the remedial action and/or decommissioning phase the potential hazards can also change. Therefore, a qualified project team uses the baseline from BHI-00066, conducts a specific team walkdown of the job to be performed, identifies the risks and hazards, and prepares the job specific work package. BHI verifies the qualifications and training per the work package by conducting pre-job meetings, work package training, start-up readiness assessments, and operational readiness reviews. Because the work conditions may change as the job proceeds, plan-of-the-day meetings are conducted at the project level. These are used to document changing conditions, verify personnel are aware of any changes, and ensure new workers are properly trained. The work planning and authorization process is driven by BHI procedures. Training, qualifications, and responsibilities are identified in BHI procedures BHI-MA-02-5.2 and BHI-HR-02-1.1. Activity and/or task specific hazards and associated training requirements are outlined in BHI-SH-02-1.7, "Project Safety Planning and Documentation." BHI has completed independent assessments and conducts self-assessments of the training and qualifications by project and function on an ongoing basis.

4.4 DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE TRAINING

DOE-RL technical staff are all assigned qualification cards in their area of responsibility per DOE's technical qualification program and Defense Nuclear Facility Safety Board recommendation 93-3. Under this program, DOE technical staff must prove their technical competence through oral and written examinations. Additionally, DOE-RL has recently hired more than a dozen highly educated and experienced excepted service employees. Many of these new hires are filling "senior technical advisor" or "senior safety advisor" positions. Thirdly, DOE-RL has a very challenging and recognized Facility Representative (FR) program. FR qualifications take from six months to one year to complete and provide the FR with in depth knowledge and understanding of safety standards and requirements as well as facility specific hazards. The FR qualification process involves numerous written examinations as well as oral interviews.

5.0 ANALYSIS AND REVIEW OF HANFORD TANKS

DOE-RL is reviewing three programs with the prime contractors, in assessing response to the October 21, 1997 memorandum: 1) existing high-level waste tank characterization programs, 2) the inactive miscellaneous underground storage tank (IMUST) program, and 3) the review of remaining tanks as a part of the facility vulnerability analysis task.

The IMUST program is being managed as discussed in Section 3. For example tank 241-Z-361 (Appendix D) will cost between $3,000,000.00 and $5,000,000.00 to sample, to characterize, and to plan for removing the content over a one year period. Fully characterizing all of the IMUST tanks cannot be completed within the DOE-RL budget plan.

The tanks not covered by the above sections will be addressed during facility vulnerability analyses (Section 2.1.3). Corrective actions for tanks and a time table for implementation will be developed.

6.0 PROCESS ACTIONS FOR EMERGENCY RESPONSE

6.1 SUMMARY

This section provides status of initiatives outlined in the two August 28, 1997 memoranda from the Secretary of Energy. This section is intended to provide the status requested by December 31, 1997. In addition, a project status report is issued monthly and is available by the tenth working day of the month.

As noted in Section 1.1, the Plutonium Reclamation Facility (PRF) incident response has been focused in five major issue areas: chemical and radiological vulnerability; emergency response; occupational health; radiological protection; and training. Each of these areas has an integrated project team of site contractor staff developing strategies for corrective measures. The following is a brief description of the scope of each of the teams:

Emergency Response Project Team

- Identify improvements to Hanford Site Emergency Preparedness (EP) program. These include enhancements to the drill program at all facilities, enhancements to the exercise program, improvements in the incident command system, improvements in the training program, and associated improvements in the emergency response plans and procedures.

- Integrate the EP program with the environmental reporting and response program. This involves assessment and restructuring of the documentation and notification process.

Occupational Health Project Team

- Identify and evaluate appropriate corrective actions related to occupational health to address deficiencies. Corrective actions for occupational health include respiratory protection, industrial hygiene (IH), and on-scene and off-scene medical evaluation. Process improvements will affect the Hanford Fire Department (HFD), the Hanford occupational medical contractor, local hospitals, the Hanford Patrol, and site contractors.

Radiation Protection Project Team

- Identify and coordinate process improvements to emergency radiological responses.

- Coordinate implementation of the Project Hanford Management Contract (PHMC) team corrective actions.

Training Project Team

- Assist in analysis, design, development, and implementation of training required to successfully complete the objectives of the other teams.

- Support other teams in decisions that relate to cost effectiveness, quality, and value of different types of training.

Chemical and Radiological Vulnerability Project Team

- Define a process and criteria for analysis of facility chemical and radiological vulnerabilities, perform analyses of priority facilities, and initiate analysis of remaining facilities.

- Assess processes for chemical management, identify deficiencies, and recommend and implement upgrades to current processes.

- Coordinate site-wide strategies for chemical management.

6.2 STATUS OF AUGUST 28, 1997, SECRETARIAL INITIATIVES

The status of each action or milestone from the two August 28, 1997, Secretarial Initiatives (DOE, 1997b; DOE, 1997c) is discussed in this section.

6.2.1 Emergency Management Decision Making

Secretarial Initiative Requirement (DOE, 1997b): "Emergency management decisions should be consistent with a conservative assessment of the situation. Emergency management training should emphasize making conservative judgements about facility conditions and personnel exposure in the absence of confirmed data. Key emergency management personnel will be trained on this matter within 60 days and DOE-RL field office managers shall confirm that this milestone has been achieved. Realistic exercises will be conducted and will include and confirm this decision making capability."

The following activities were completed:

- All facility emergency action levels (EALs) for the Hanford Site were reviewed to ensure they contained an explosion scenario, where appropriate. The EAL procedures were revised. This action was completed on July 10, 1997.

- All EALs were revised to include clauses for conservative supervisory judgement and to move the "generic" classification criteria into the body of the procedure to make it more user friendly. This was completed on October 27, 1997.

- The building emergency directors and incident command post staff reviewed the process for event categorization. This task was completed on October 27, 1997.

- An exercise was conducted at one of the hazardous facilities to evaluate the effectiveness of the revised EAL procedures and training. Several issues associated with implementation of protective actions were identified. Lessons learned have been factored into the corrective action process. This task was completed November 1, 1997.

- The staff members of the Patrol Operations Center were retrained and empowered to be more proactive in emergency response duties and to ensure timely classification and notifications. Emergency response checklists were revised. The action was completed by July 1, 1997.

Actions planned include:

- Additional exercises will be conducted in FY 1998 to further evaluate training and to validate and test additional changes to the emergency response organization. The exercises will involve the incident command system, and activation of the Hanford Emergency Operations Center, the Unified Dose Assessment Center, and a limited staffing of the Joint Information Center. A field exercise currently scheduled for June 1998 will be the validation exercise for all changes made to the EP program. This validation will involve all levels of emergency responders on the Hanford Site, as well as the local county emergency operations centers, the states' emergency operations centers, and the U.S.Department of Energy Headquarters.

6.2.2 Protective Equipment and Staffing

Secretarial Initiative Requirement (DOE, 1997b): "Personal protective equipment, equipment for field monitoring of chemical hazards, and qualified staff, i.e., industrial hygienist, needed for post accident activities must be readily available. Availability and qualification of critical personal protective equipment will be confirmed within 45 days. Sufficient numbers of qualified personnel must be available at all times for response and post accident activities involving chemical or radiological hazards. Readiness should be periodically verified in accordance with established departmental requirements."

The current readiness status is as follows:

- The personal protective equipment (PPE) used by the HFD, the designated Hanford emergency response organization, has been evaluated by a team of IH and HFD personnel. As of October 13, 1997, the HFD has ready access to the various levels of PPE, as prescribed by Title 29 Code of Federal Regulations (CFR) 1910.120 (Hazardous Waste Operations and Emergency Response). IH support will be provided to the HFD so the adequacy of the PPE can be continually maintained.

- Culminating on September 20, 1997, trained and qualified respiratory protection technicians from the HFD inspected all 690 Hanford Scott E-Z

Flow regulator systems associated with the model 4.5 Self-Contained Breathing Apparatus (SCBA), model 2.2 Ska Paks, and model 2.2 Airline respirators. Some deficiencies were noted, primarily associated with delinquencies involving routine regulator/reducer testing and maintenance. HFD is correcting these deficiencies. The need for the HFD to develop a SCBA regulator/reducer recall system was evaluated and a final decision is scheduled for the week of December 1, 1997.

All SCBA regulators and reducers used at the Plutonium Finishing Plant (PFP) were tested and the preventative maintenance was completed.

- A review of the model MCU-2/P respirator used by the Hanford Patrol was completed. A decision was made to replace it with the National Institute of Occupational Safety and Health approved mine safety appliance model Advantage 1000 respirator. New respirators for the Hanford Patrol were purchased and all personnel were trained and fit tested by October 31, 1997.

- As of October 13, 1997, the radiological field team members who monitor airborne radioactive releases away from the event scene during an emergency event have ready access to the Radiological Assistance Program equipment. It includes SCBAs and chemical protective clothing. The radiological field teams now have four emergency response kits that each contain, among other items:

  - four Air Purifying Respirators (APRs)
  - APR High Efficiency Particulate Air (HEPA) canisters/cartridges
  - four sets of anti-contamination clothing
  - one box of latex gloves.

  APR combination HEPA/chemical canister/cartridges will be provided to the radiological field teams.

- A dedicated, professional industrial hygienist will be on call to the HFD to support on-scene emergency response activities. Qualifications and responsibilities of the industrial hygienist have been developed. Efforts are underway to fill the position by December 15, 1997.

- A duty roster identifying on-call radiological technical staff and management available for response to an emergency during back shift and weekend operations has been developed. The roster includes the names and contact information for each operating facility with the potential for an emergency event involving radioactive materials. The roster also includes location and contact information for resident on-shift radiological control technicians available for emergency assistance, and location and area information for decontamination facilities and equipment.

- Prime contractors concurred that Fluor Daniel Hanford (FDH) will provide IH support to the non-radiological hazard evaluator position within the Unified Dose Assessment Center (UDAC). Specifics regarding funding and technical support to the UDAC non-radiological hazard evaluator position were completed and training was completed November 7, 1997, for three FDH industrial hygienists. Training for two additional FDH industrial hygienists was completed. HFD has trained the Mid-Columbia Emergency Medical Services director. Hanford Environmental Health Foundation (HEHF) medical staff members are available as needed to consult with medical staff of designated hospitals.

6.2.3 Protective Treatment of Personnel

Secretarial Initiative Requirement (DOE, 1997b): “Emergency procedures must provide for timely medical attention to injured or potentially exposed personnel. Policy and procedures must exist for the care and continued monitoring of affected personnel for an appropriate period after accidents. Review of such policy and procedures, with participation of local medical authorities and workers, will begin immediately and be completed within 90 days.”

- HEHF has initiated discussions with the three local hospitals to develop a standardized medical response to Hanford emergency medical events. The site medical director has met with medical representatives from the three local hospitals and reached agreement on the appropriate medical protocols for workers exposed to chemical and radiological hazards. The process for accessing site resources and the transfer of information, including the follow up for case management services between the site medical staff and the hospitals, has been clearly defined. The specifics of the agreements are being formalized in a memorandum of understanding between DOE-RL and the local hospitals. Arrangements are being made to review this information with the labor representatives.

Secretarial Initiative Requirement (DOE, 1997b): "Realistic exercises will be conducted and will include and confirm that procedures are implemented for the notification and protection of workers in a variety of remote locations (indoors and outdoors) at event onset and that methods are available to control their sheltering."

- All Hanford Site facilities are required to participate annually in a protective action drill to practice and to test the response to the take cover and evacuation sirens. An exercise (Rimrock), that required a take cover response by all residents of the 300 Area, was conducted during October 1997.

- Take cover and evacuation exercises were conducted in the Hanford 200 Area and 400 Area to evaluate the response to a take cover and evacuation siren. These exercises were completed by November 15, 1997.

- The emergency plan implementing procedure (DOE-RL, 1997h) for the Hanford Site take cover actions was revised to include a more conservative approach to activation of the take cover emergency sirens and crash alarm telephone system. This revision will expedite the process of notification of employees when a take cover action is required. The revised procedure was issued October 10, 1997.

Secretarial Initiative Requirement (DOE, 1997b): "Security, medical, and other emergency responders must be trained to recognize the health impacts of potential onsite accidents, including the effects of exposures to chemicals and potential for post-traumatic effects associated with accidents."

- HFD trained and qualified emergency medical technicians (EMTs)/paramedics who are responsible for providing on-scene medical evaluations of injured or potentially exposed personnel. EMTs/paramedics are trained in the assessment, decontamination, and medical management of employees exposed to chemical, radiological, and biological hazards. Paramedics/EMTs maintain national and Washington state certification and continuing education requirements and comply with local training and emergency medical service protocols.

6.2.4 Hazard Information

Secretarial Initiative Requirement (DOE, 1997b): "Procedures must be in place to provide local medical facilities with available information on chemical and radiological hazards, as well as timely qualitative and quantitative exposure information for individuals in the event of an accident. Review and development of these procedures, in coordination with local medical facilities, will begin immediately and will be completed within 90 days."

- Arrangements are being made to provide dedicated IH support to the HFD, the designated Hanford emergency response organization. This will enable qualitative hazard assessments and quantitative exposure data to be collected

early on in the event for use onscene by the EMT/paramedic medical evaluators and by the off-site medical facilities. In addition, a Hazard Information form has been developed to provide available chemical, biological, and radiological hazard event and patient exposure information to supplement the State of Washington Emergency Medical Service (EMS) Medical Incident Report. Both forms will be initiated at the event scene and travel with the affected employee to the local medical care facility. Training on the use of the Hazard Information form was provided to the HFD EMT/paramedic staff during the week of November 17. Arrangements are being made to ensure the local hospitals receive similar briefings.

Secretarial Initiative Requirement (DOE, 1997b): "Realistic exercises will be conducted and will include and confirm the ability of DOE contractors to provide local medical facilities with adequate information for a variety of potential accidents to effectively diagnose and treat injured, exposed, or potentially exposed workers."

- The effectiveness of the Hazard Information form is being evaluated under a number of emergency scenarios, from the perspective of the paramedics/EMTs, the hospital staff, and applicable technical disciplines, i.e., industrial hygiene and radiological control.

- Planned, scheduled drills/exercises will include the evaluation of the method to ensure local medical facilities are provided adequate hazard and employee exposure information.

6.2.5 Emergency Action Level Criteria Review

Secretarial Initiative Requirement (DOE, 1997c; Section 1,1): "Review the criteria, e.g., emergency action levels (EAL), used to determine emergency and significant event recognition and categorization to ensure that all reasonable event indicators are adequately covered by procedures and that procedures reflect an expeditious process."

A review of the emergency action level criteria was completed. The following corrective actions were accomplished.

- The criteria for determining emergency and significant event recognition and categorization were revised to be more conservative and were incorporated into facility EAL procedures. The action was completed by October 27, 1997.

Actions planned include:

- The procedure for conduct of hazards assessments and development of associated EALs is being reviewed. The revised procedure will ensure chemical inventories are evaluated for their potential to cause an emergency. The procedure will require a critical evaluation of event indicators to ensure all EALs are clear and concise and either symptom based or event based. The procedure will be issued by December 31, 1997.

6.2.6 30-Day Training Procedure Review

Secretarial Initiative Requirement (DOE, 1997c; Section 1,2): "Review training procedures and conduct refresher training and drills for personnel responsible for event categorization, notification, or reporting. Ensure that these personnel fully understand the departmental emphasis on timely event classification and notification."

A review was conducted and corrective actions were identified as follows:

- A task team revised the procedure used for response by the incident command post. The procedure clearly states the process of recognition, classification, and notification of events. This was completed on November 10, 1997.

Actions planned include:

- The emergency drill and exercise program is being revised to provide better training and validation of training. A proposed concept and draft policy was completed. It will be reviewed and issued during December 1997.

- The drill improvements include a formal grading process, a performance measurement against a standard set of criteria, and increased participation by emergency responders. The policy will be implemented in January 1998.

6.2.7 30-Day Solicitation

Secretarial Initiative Requirement (DOE, 1997c; Section 1,3): "Solicit the comment of other federal, state, local, and tribal agencies regarding timely notification of all events of concern."

- A review of the process for providing early notifications to offsite agencies was made and discussions held with other federal, state, local, and tribal agencies. This ensured their concerns regarding the process were addressed as relevant procedures were revised. The improved process has been successfully demonstrated several times since revision of the procedures and implementation on May 30, 1997.

Actions planned include:

- An appraisal of the early notification process is planned during December 1997 to evaluate the timeliness, effectiveness, and satisfaction with the process. The results of this evaluation will be incorporated into revisions to the notification process.

6.2.8 15-Day Reporting

Secretarial Initiative Requirement (DOE, 1997c; Section 1): "Within 15 days of the completion of the preceding actions, managers shall report to the director of the Office of Nonproliferation and National Security on their reviews and actions taken."

DOE-RL completed this within a letter to U.S. Department of Energy Headquarters (DOE/HQ) (DOE-RL, 1997i).

6.2.9 Emergency Readiness Assurance Plan Refresher Training and Drills

Secretarial Initiative Requirement (DOE, 1997c; Section 2): "...immediate review of emergency action levels and associated event categorization criteria at all ... facilities with the potential for significant offsite consequences from radiological and non-radiological hazardous materials."

The Emergency Preparedness organization reviewed emergency action levels and associated event categorization criteria at all facilities with the potential for significant offsite consequences from radiological and non-radiological hazardous materials. Revisions to the EAL procedures were completed on October 27, 1997. The FY 1998 Emergency Readiness Assurance Plan (ERAP) reflects the status of the actions taken.

Actions planned include:

- The FY 1999 ERAP will include additional actions completed during FY 1998 as a result of the PRF declared emergency.

6.2.10 Refresher Reporting

Secretarial Initiative Requirement (DOE 1997c, Section 3): "Managers of Operations and Field Offices will include the status of refresher training and drills for all personnel responsible for event categorization, notification, or reporting in their ERAPs, which are submitted annually to the Office of Emergency Management for inclusion in the annual report on the status of the department's emergency management system."

- The FY 1998 ERAP was completed and included a status of actions taken relative to training. Drills and exercises for personnel responsible for event categorization, notification, and reporting were included.

6.2.11 Emergency Notification

Secretarial Initiative Requirement (DOE, 1997c; Section 3): "Manager of Operations and Field Offices should ensure that emergency notification procedures to offsite agencies

contain provisions for confirming receipt of the notification by appropriate personnel and not for example, by answering machines."

The Emergency Preparedness organization determined that only one organization does not have a manned phone.

Actions planned include:

- Alternative contacts will be identified for the unmanned phone line.

6.2.12 Non-Emergencies

Secretarial Initiative Requirement (DOE, 1997c): "Managers of Operations and Field Offices should ensure that emergency notification procedures to offsite agencies contain provisions for confirming receipt of the notification by appropriate personnel, for example, by answering machine."

The Emergency Preparedness organization determined that only one organization does not have a manned phone.

Actions planned include:

- Alternative contacts will be identified for the unmanned phone line.

6.2.13 Content of Notifications

Secretarial Initiative Requirement (DOE, 1997c): "Oral notifications are to be succinct, and provide, when available, the following information: 1) a description of the occurrence; identify injuries to personnel, environmental releases, and/or personnel exposures, protective actions implemented, including numbers when possible; 2) the location of the facility or incident; 3) an indication of whether the occurrence is over or is still in progress; 4) the name and call back number of the person reporting the occurrence; 5) the time of the occurrence; and 6) what other notifications have been made including media interest."

The content of notifications was evaluated and determined to be sufficient.

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APPENDIX A

WASTE MANAGEMENT PROJECT

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WASTE MANAGEMENT PROJECT

Waste Management Federal Services of Hanford, Inc. (WMH) is tasked with the waste management responsibility at the Hanford Site. WMH brings extensive commercial waste management experience to Hanford. WMH packages, treats, stores, and disposes of Hanford waste. Staff manage disposal trenches; repackaging facilities; provide for off-site disposal; and containerize, label, and manifest off-site shipments to ensure public safety. WMH has a lead role in minimization of the generation, volume, and mass of newly generated or recovered waste. Waste containers are identified and tracked. Waste is packaged to meet numerous waste acceptance criteria.

In response to the DOE-RL direction, WMH made an initial inventory of reactive chemicals. This initial inventory and findings were submitted to Fluor Daniel Hanford, Inc. (FDH) on June 9, 1997 (WMH, 1997a). The inventory was prepared using facility inspections and an evaluation of the site-wide chemical inventory for potentially reactive, unstable, or dangerous chemicals. The chemicals identified ranged from hydroxylamine nitrate (HN) to peroxide forming chemicals. The letter also identified continuing activities to evaluate and dispose of chemicals of concern. A follow-up letter on June 17, 1997 (WMH, 1997b) identified the results of the evaluation and the specific chemicals evaluated, the locations, and the quantities.

WMH evaluated all chemicals and determined the chemicals to be properly stored, i.e., containers were in good condition, showed no signs of deterioration or decomposition, and were stored according to manufacturers' recommendations. The chemicals were assessed for shock sensitivity, peroxides, peroxide performance, decomposition, thermal instability, strong oxidation capability, volatile organics, and finely divided metallic powders. WMH verified the associated material safety data sheets (MSDS). WMH initiated development of an internal database to maintain and to track issues identified in the assessment. The WMH waste inventory is being tracked using the site-wide Solid Waste Information and Tracking System (SWITS) database.

In addition to recycling chemicals by shipping the stabilized excess to offsite vendors, WMH verified correctness of chemical labeling on August 1, 1997, and completed training of applicable WMH personnel on August 15, 1997. A June 23, 1997 letter (FDH, 1997a) provided a detailed facility-by-facility account of the WMH chemical disposition.

Subsequently DOE-RL and FDH agreed to conduct a more extensive review of the chemical storage to identify vulnerabilities from the chemicals or materials subject to changes in physical or chemical properties. No additional vulnerabilities were found.

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APPENDIX B

SPENT NUCLEAR FUELS PROJECT

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SPENT NUCLEAR FUELS PROJECT

K BASINS

DE&S Hanford, Inc. (DESH) provides management and operation of the spent nuclear fuel storage basins at the 100K reactor locations. The major project focus is to safely store the spent fuel located in the 105KE and 105KW basins, as well as eventual removal of the fuel to dry storage in the 200 East Area. DESH also maintains and operates the essential support facilities at 100K such as the 183KE water plant, 181KE river pump station, and 165/190KE facilities.

Upon request from Fluor Daniel Hanford, Inc. (FDH) Environmental, Safety, and Health (ES&H), DESH completed its initial inventory and reported the findings on June 16, 1997.

DESH performed the initial assessment using knowledgeable personnel to evaluate the DESH managed facilities at 100K. Bechtel Hanford, Inc. (BHI) maintains the deactivated facilities at 100K that were not included in the DESH K Basin assessment. The first phase of the evaluation was to identify the DESH facilities that had or currently have chemical storage or process systems. Two major facilities were identified as meeting the screening criteria. The facilities were the 1706KE and the 183KE. The second phase was to evaluate the chemical storage systems located in the two facilities. The following is a synopsis of the review:

1706KE and Associated Facilities

This facility was used for research and development for Hanford reactor technologies, including water chemistry process and corrosion testing. These activities occurred mainly in the 1950s and early 1960s, though some continued into the mid-1980s. The facility is currently being used for office space and a health physics counting facility. Most of the systems in the facility have long been deactivated and have set unmanaged for many years.

On May 20, 1997, a complete inventory of the 1706KE tank systems was made, and 43 tanks were identified as having been used in a chemical process. Those that were accessible were photographed and visually inspected for residues.

On May 28, 1997, a retired engineer who had worked at the facility provided process knowledge for tanks. The engineer was able to provide adequate knowledge to document the uses and as-left status of the remaining tanks.

Conclusion for 1706KE facilities: No identified tank systems have been determined to have a potential for explosion or violent reaction.

183KE Water Treatment Facility

The 183KE facility was a large production water treatment facility capable of treating more than 200 million gallons per day for reactor cooling as well as routine plant water needs. The facility contained several chemical systems used for control of water chemistry.

Today the facility is only used for the production of service and potable water. The only chemical systems that are active are those commonly used in municipal water treatment, i.e., chlorine, polymers, and coagulants. These systems have been evaluated by knowledgeable facility personnel and have been determined to have no potential for explosion or violent reaction as currently managed.

The facility also contains deactivated chemical systems used for water quality during reactor operation. These systems used sodium silicate and sodium dichromate.

The sodium silicate tank systems were drained and the tanks used for mixing coagulants; however, the piping systems remain with residual material. This corrosive residue has been determined to not be a threat for explosion or violent reaction with surrounding materials.

The sodium dichromate tanks were removed in the 1970s and the piping systems were drained and flushed. This system has been determined to be safe.

An evaluation of the 183KE facilities was completed on May 20, 1997, with no concern identified.

Other 100K Chemical Storage

All other chemical storage at 100K is in small quantities. The chemicals are stored in manufacturers' packaging in flammable storage cabinets in accordance with standard industry practice. Storage areas are routinely inventoried. No incompatible storage has been identified.

DESH did not include any sumps or sump tanks in the evaluation. They were outside the scope of the original request to evaluate areas of high risk.

In conclusion, the DESH operated facilities at 100K do not use large volume chemical processes with the exception of the 183KE water plant. Chemicals are used and stored in accordance with the manufacturers' recommendations and industry standards. The chemicals are routinely checked for container conditions and compatibility. Excess chemicals are dispositioned.

APPENDIX C

TANK WASTE REMEDIATION SYSTEM PROJECT

APPENDIX C

TANK WASTE REMEDIATION SYSTEM PROJECT

Lockheed Martin Hanford Corporation (LMHC) manages 177 tanks and associated miscellaneous facilities containing millions of gallons of high level radioactive wastes resulting from the extraction of plutonium from fuel rods. Workers sample high activity wastes and ensure the best possible containment of leaky, aged tanks and more modern double shelled tanks. LMHC brings project management skills to the Hanford Site to recover from past project delays and difficult technical problems that must be faced to ensure worker safety and public health.

A review by LMHC of the Tank Waste Remediation System (TWRS) facilities for conditions similar to the incident at the Plutonium Reclamation Facility (PRF) was performed by the TWRS Nuclear Safety group. The results of the review were reported in an operational safety assessment. The review included existing TWRS facilities, miscellaneous inactive storage facilities, and orphan facilities.

No vulnerabilities that require immediate consideration and corrective action were identified during the review. Additional characterization is needed for some 244-BXR Facility tanks, for the 209-E Critical Assembly Room and Mix Room, and for the 244-AR Vault tanks. The underground waste storage tanks were not examined as part of this review as they have been extensively studied and continuing safety programs are in place to manage the waste in the tanks.

A list of miscellaneous inactive storage facilities was assembled for the draft TWRS facility safety analysis report (FSAR) by reviewing the Hanford facility core database. The resulting draft FSAR listing was reviewed to identify those tanks that might contain potentially hazardous, non-radioactive chemicals, such as nitric acid. Eight tanks were identified; and process histories for these will be assembled in fiscal year (FY) 1998. A prioritization of chemical vulnerability will be completed along with the inactive miscellaneous underground storage tanks (IMUSTs).

Orphan facilities are those that might be inadequately described in the TWRS authorization basis. Orphan facilities have been identified from several sources: facilities identified in earlier vulnerability studies, reviews of the Waste Identification Data System database, and interviews with employees recognized for expertise gained through many years of TWRS field experience. Nineteen orphan facilities have been identified. These range from waste storage pads and maintenance shops to ion exchange columns, vaults, and inactive evaporators and their ancillary equipment. Drawing reviews and facility walkdowns will be used to accomplish two goals: identification of tanks and other components that might exhibit some degree of chemical vulnerability, and identification of inadequacies in the authorization basis.

Facility walkdowns have been completed for several of these identified orphan facilities. It is anticipated that additional IMUSTs and non-IMUSTs will be identified. As an

example of the latter, there are a number of tanks in the 242-T evaporator that need additional investigation; their current unknown status is recognized as an identified potential vulnerability.

The completion of the identification of orphan facilities, the inspections, and the imposition of interim control measures, if needed, will be completed in FY 1998. Also to be completed this fiscal year is the identification of associated chemical vulnerabilities, identification of associated IMUSTs and non-IMUSTs, and a plan for upgrading the authorization basis to fully address these facilities.

APPENDIX D

FACILITY TRANSITION PROJECT

APPENDIX D

FACILITY TRANSITION PROJECT

Introduction

B&W Hanford Company (BWHC) is responsible for stabilization and deactivation activities at the Hanford Site. After years of fulfilling their production missions, many of the facilities are highly contaminated. The production mission has ceased and the facilities are now in different phases of the decommissioning process, all with different hazards and radiological concerns. After reviewing the documentation, the BWHC response is divided into two sections. The first section responds to information requested on inactive miscellaneous underground storage tanks (IMUST). The second section provides details on the facility specific actions taken.

BWHC Inactive Miscellaneous Underground Storage Tanks

There are two tanks at BWHC managed facilities with all three characteristics that define an IMUST. Those characteristics are inactive, underground, and radioactive. One tank is located at B Plant, designated as TK-270-E-1. The tank was placed in service in 1952 and ceased operation in the late 1950s. The second tank is located at the Plutonium Finishing Plant (PFP) and is designated as PFP-TK-241-Z-361.

B Plant IMUST Tank-270-E-1

Available data on B Plant TK-270-E-1 have been reviewed to ensure there are no potential reactive chemicals. The tank is known to contain approximately 3,800 gallons of dry lime sludge. Radiation readings indicate less than 0.5 millirem per hour at the risers extending from the stainless steel tank. Measured contamination levels within the tank are on the order of 100,000 counts per minute beta/gamma. Information on the tank is contained within the Waste Identification Data System (WIDS).

The tank will be deactivated according to the approved B Plant End Points Document (BWHC, 1997a). This document identifies this tank to be visually inspected to verify it is free of all liquids, isolated, characterized, and posted according to the Hanford Site Radiological Control Manual (DOE-RL, 1994).

TK-270-E-1 is identified in WIDS and the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement [TPA]) (Ecology, et al, 1996) as a Resource Conservation and Recovery Act (RCRA) solid waste management unit.

PFP IMUST Tank-241-Z-361

The following actions have been accomplished regarding the potential presence of reactive chemicals in PFP IMUST TK-241-Z-361:

- Chemical Vulnerability Assessment (BWHC, 1997b)
- Unreviewed safety question screening was done August 12, 1997, with an evaluation on September 24, and a declaration on October 15, 1997
- Characterization Program Plan written (BWHC, 1997c)
- Baseline change request submittal (November 4, 1997), partial funding pending.

Sample data, letters, and reports documenting samples, sample data, and criticality analyses have been reviewed by BWHC. A chemical vulnerability assessment (BWHC, 1997b) of PFP-TK-241-Z-361 includes a summary of some of the historical data. Additional research and analysis is continuing for the preparation of a justification for continued operation (JCO). Additional research into operational and laboratory logbooks is providing further information, but has not yet been summarized. An assessment of the three existing criticality analyses continues with a final report expected by December 31, 1997. No criticality problems are expected. No immediate hazard has been identified. Additional restrictions, postings, and safety precautions have been put into place to minimize work in the vicinity of this tank and to manage the hazard to workers at PFP.

The following future actions will be taken: Tank risers will be opened to ventilate the vapor space; high-efficiency particulate air (HEPA) breather filters will be installed; vapor samples, in-tank video data, and sludge samples will be taken and analyzed to provide chemical, radiological, isotopic, and physical properties data. Closure of the unreviewed safety question and ultimate remediation of the tank contents are planned.

Facility Specific Actions

B Plant/WESF: Summary of Action

Five recent reviews have been conducted of the chemical safety at B Plant/Waste Encapsulation and Storage Facility (WESF). Assessments were made as to whether B Plant/WESF ever had hydroxylamine nitrate (HN) or similar reduction and oxidation chemicals or other potentially reactive chemicals. The facility issued a report on all chemicals used or stored at B Plant/WESF. Once process engineers completed their review, facility industrial hygienists independently reviewed chemical storage. A representative from DuPont performed a two day assessment of chemical safety management systems and practices. The results of the reviews are as follows:

- Direct application: On May 15, 1997, the facility completed a project-wide review to assess whether HN has ever been used or stored at the facilities, or

whether there is potential for similar strong oxidation/reduction agents to react.

Results: No risks similar to that posed by HN explosion or oxidation-reduction-type reactions are present at B Plant/WESF.

- Broader Application: On May 30, 1997, the facility completed a review to assess whether facility tanks, piping systems, etc., contained materials that could be subject to spontaneous reactions.

  Results: No similar risks were identified.

- Full Facility Review: On June 13, 1997, the facility completed a review of all safety vulnerabilities resulting from the presence of dangerous chemicals or materials.

  Results: The small remaining chemical inventory does not pose a significant risk to workers, the public, or the environment. All chemicals are stored, used, and handled in a safe, compliant manner (BWHC, 1997d).

- Industrial Hygiene (IH) Review: IH personnel completed a review of hazardous material handling and storage. Included in this review were all remaining bulk chemicals as well as janitorial and shop supplies.

  Results: No problems were identified.

- Independent DuPont Review: This examination consisted of reviewing applicable facility procedures, interviewing facility personnel, and physically walking down areas where chemicals are used and stored.

  Results: No written report has been issued, although during the exit briefing with facility management, the assessor noted “no areas of significant weaknesses exist.”

Plutonium Finishing Plant (PFP): Summary of Actions

Documentation of an initial review of the PFP chemical inventory was issued on June 16, 1997. The initial assessment focused on ten areas of potential immediate concern. The review did identify two immediate hazards: a HN nitric acid filled line containing about 4.4 liters within the Plutonium Reclamation Facility (PRF), and a five-gallon waste container containing HN in the hazardous waste 90-day storage area. As described in the initial report, immediate mitigative actions were taken to address these concerns. The PRF line containing HN nitric acid was sampled and analyzed, and the line was drained. Analytical results indicate trace amounts of hydroxylamine in dilute nitric acid. The five-gallon container and the drum containing the contents of the drained line have been shipped to an off-site vendor. Additional small quantities of HN are being stored at PFP, in accordance with appropriate precautions, for use in PFP laboratories.

Access to all equipment, ductwork, and facilities within the PFP complex has not been possible. This has precluded complete analysis of the chemicals present in some cases. Recommendations for mitigation or characterization actions for high priority items have been prepared. Available information and process knowledge indicate there is no immediate hazard to the public, environment, or workers because of uncertainties.

The assessments covering the entire scope of the PFP complex have not identified additional potential hazards of explosions such as that which occurred in Tank A-109. The inventory of supply chemicals has been well characterized, and a timely inventory is kept via the Hanford Hazardous Material Inventory Database (HMID). The amount and variety of chemicals in laboratory and process areas are extensive. The Analytical Laboratories have a well controlled inventory system for both supply chemicals and hood/glovebox areas. Wastes are handled in accordance with procedures and regulations. Most issues were found in inactive process and support areas.

Chemical hazards were identified in PFP facilities that require characterization and mitigation. Several characterization actions have been completed. Mitigation actions are underway.

The assessment found two potential chemical hazards that require characterization actions to complete determination of a specific hazard that may lie outside the facility authorization basis, i.e., a potential unreviewed safety question (USQ), and JCO (if required).

- USQ Screening to Verify Condition of Underground Settling Tank 241-Z-361. Complete. A USQ was declared. JCO is in preparation.

- USQ Screening to Verify Contents of PR Cans Suspected of Containing Mixed Organics.

Additional characterization is needed to evaluate the following areas revisited during the assessment:

- update information on condition of 242-Z Americium Recovery Facility

- condition of Remote Mechanical “C” line reactor tank in Glovebox HC-9B

- condition of test resin and acid rags in Plutonium Process Support Laboratories (PPSL)

- identify suspect liquid in pre-reduction tank in Glovebox HC-7C

- identify suspect liquid in scrubber tank for Glovebox HC-46F

- verify composition of 291-Z sump sludge

- verify composition of residues in glovebox vacuum cleaner filter boxes.

Recommended additional actions to manage chemical hazards at PFP include:

- completing the characterization and mitigation of chemical hazards identified in this document and in HNF-SD-CP-TI-219 (BWHC, 1997e) in a timely fashion
- completing a minimization in PFP stored chemical inventory PFP management has already issued a policy to implement chemical minimization.
- pursuing the complete draining and flushing of inactive tanks, vessels, and lines as part of facility deactivation
- assuring that all hazardous chemicals found in process areas during this assessment are added to the HMID database
- incorporating awareness of the changing nature of chemical hazards into the PFP safety management system.

Plutonium Uranium Extraction (PUREX) Facility: Summary of Actions

PUREX did not identify any immediate vulnerabilities. The presence of 375 pounds of silver nitrate ($AgNO_3$) was noted. This was not noted as a vulnerability.

Fast Flux Test Facility (FFTF): Summary of Actions:

FFTF Safety and Regulatory Compliance personnel reviewed all chemicals stored or used at the facility. This included a review of the Emergency Planning and Community Right-to-Know Act (EPCRA) chemical inventory, field walkdowns by FFTF Regulatory Compliance personnel, and discussions with FFTF Operations and Maintenance personnel. Sodium and sodium-potassium alloy (NaK) were the only highly reactive chemicals identified at the FFTF. These chemicals are integral to the operation of the facility, their hazards are well known, and facility personnel are trained and experienced in their safe handling.

300 Area Stabilization Project Facilities: Summary of Actions

Various inspections, walkdowns, and reviews of chemicals have been performed at the following BWHC 300 Area Stabilization Project facilities:

- 324 Facility
- 327 Facility
- 309/Plutonium Recycle Test Reactor (PRTR) Facility
- Fuel Supply Shutdown (FSS) Facilities
- Fuels and Materials Examination Facility (FMEF)
- 308 Building.

The facility inspections included walkdowns done to check for the presence of residual explosive chemicals. This summary provides descriptive information regarding those inspections.

324 Facility Inspection:

- Obtained documented information regarding the last use of each inaccessible and accessible vessel.

- Information reviews were performed to verify that there are no residual explosive chemicals present.

- The 324 facility mission did not include chemical separation of nuclear fuels. Several commercial spent fuel assemblies were disassembled, the rods sectioned, and the fuel was dissolved in a nitric acid solution. The product was sent to the 325 Building and the waste from the 325 Building process/tests was returned to 324 for vitrification. HN was not utilized in the 324 process, and there is no other history of its use in the 324 Building.

- Records indicate two vessels in a hot cell contain dilute nitric acid; the vessels will be disposed of as part of the B-Cell Cleanout Project.

- As part of ongoing cell cleanout and facility deactivation activities during 1992 through 1996, actions have taken place to remove chemicals that are no longer actively used, flush the vessels, verify vessels are empty, and sample chemical tanks containing any residual heel material. Other current actions are further reducing the chemical inventory in vessels.

- Facility walkdowns included facility rooms and labs. There are small quantities of flammable chemicals present in flammable storage cabinets.

- Inspection included review of chemical inventory information.

- Facility inspections included walkdown of the 324 facility and the 3718-G Storage Building, and review of Pacific Northwest National Laboratory (PNNL) chemical inventory information. PNNL is a tenant in the 324 facility.

- Overall conclusion: The 324 facility does not have a condition similar to that involved in the PRF explosion. Chemical usage is different than that of PFP. Equipment does not have residual explosive chemical conditions.

327 Facility Inspection:

- 327 facility does not contain tanks.

- Water storage pool does not contain explosive chemicals.

- Hot cells have small containers for handling equipment decontamination materials, which do not involve explosive chemicals or explosive chemical mixtures.

- Facility did not perform fuel reprocessing or chemical separation, and did not use chemicals similar in characteristics to those used at PFP.

- There are small quantities of flammable chemicals stored in flammable storage cabinets.

- Inspection included review of chemical inventory information.

- Overall conclusion: The 327 facility does not have a condition similar to that of PFP. Equipment does not have residual explosive chemical conditions.

309/PRTR Facility Inspection:

- Facility contains seven vessels, which were cleaned, flushed, and emptied in the past and do not contain residual explosive chemicals or chemical mixtures.

- Chemicals have been removed previously from facility and equipment.

- Facility equipment does not contain residual explosive chemicals.

- Facility is unoccupied and is in transition status, with facility deactivation in progress.

- Overall conclusion: 309/PRTR facility does not have a condition similar to PFP. Equipment does not have residual explosive chemical conditions.

FSS Facilities Inspection:

- Vessels and tanks are empty and were cleaned and flushed.

- Some tanks used organic solvents, acids, or caustics, with intermediate rinse water tanks in the past. Tanks are empty and clean and were flushed. Visual inspection shows little or no visible residue. Tanks and vessels do not contain residual explosive chemicals.

- Tanks and vessels in 313, systems that held uranium in the past, and Waste Acid Treatment System have been characterized and inspected and are being removed as part of facility deactivation and RCRA closure activities. Review of process records and information, and visual inspection show that equipment does not contain residual explosive chemicals or mixtures.

- There are small quantities of flammable chemicals, reactive acids, or bases in chemical storage cabinet areas.

- Inspection included review of chemical inventory information.

- Overall conclusion: FSS facilities do not have a condition similar to PFP.

Equipment does not have residual explosive chemical conditions.

FMEF Inspection:

- FMEF has a vessel/tank that contains glycol for heating, ventilating, and air conditioning chiller system. This does not contain explosive chemicals or chemical mixtures.
- FMEF does not perform processing operations.
- FMEF contains a tank for liquid nitrogen capability.
- FMEF contains a tank for waste water collection (sinks and drains).
- There are small quantities of flammable or reactive chemicals stored in chemical storage cabinets.
- Overall conclusion: FMEF does not have a condition similar to PFP. Equipment does not have residual explosive chemical conditions.

308 Building Inspection:

- Reviewed deactivation status information; numerous facility walkdowns performed during deactivation and turnover activities.
- 308 Building is in deactivated and stabilized status.
- Facility has been unoccupied since 1994 and chemicals were removed during deactivation activities. Absence of chemicals was verified during turnover walkdowns. Equipment does not contain residual explosive chemicals or chemical mixtures. Facility turnover documentation was completed in July 1996.
- 308 did not perform fuel reprocessing or chemical separation and did not use chemicals similar to those at PFP.
- Overall conclusion: 308 Building does not have a condition similar to PFP. Equipment does not have residual explosive chemical conditions.

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APPENDIX E

INFRASTRUCTURE PROJECT

APPENDIX E

INFRASTRUCTURE PROJECT

DynCorp Tri-Cities Services, Inc. (DYN) provides essential infrastructure support to the Hanford Site, including facility maintenance and site services, real estate and property management, facility landlord services (utilities), emergency preparedness, and emergency response. DYN manages thousands of Hanford facilities. The emergency related activities require that DYN have a high degree of involvement in the Plutonium Reclamation Facility (PRF) recovery initiative. DYN, upon request from Fluor Daniel Hanford, Inc. (FDH) Environmental, Safety, and Health (ES&H), completed its initial inventory and reported the findings on June 16, 1997 (DYN, 1997a). DYN used a three phase approach to identify and correct potential problems.

In the first phase, completed May 23, 1997, facilities were evaluated for chemicals that might pose a significant threat. Guidance was provided to help managers recognize potential problems, e.g., storage or container conditions, incompatible chemical mixtures, reactive or unstable chemicals, bulk storage, etc. No hydroxylamine nitrate (HN) was discovered during this phase. Small amounts of potentially reactive materials such as nitric acid, 1,4-dioxane, hafnium metal powder, and calcium hypochlorite were identified, but the materials were in good condition and were properly stored.

During phase two, completed on July 25, 1997, a complete inventory of all major chemical use or storage areas was conducted. During the inventory, storage locations were evaluated to determine if practices were adequate to prevent hazardous materials incidents. A letter (FDH, 1997a), provided a detailed facility-by-facility account of the DYN chemical actual and proposed disposition. Another letter (DYN, 1997b) to FDH identified the facilities evaluated, issues identified, and projected actual issue resolutions. With the exception of the two minor issues identified, all chemicals were properly stored in containers of good condition, showing no signs of deterioration or decomposition, and in accordance with manufacturers' recommendations.

The third phase of the evaluation, completed September 26, 1997, covered the remaining use or storage areas. No significant issues were discovered, although some products were declared to be excess. Actions identified in phase one were completed during this time and excess products were dispositioned. DYN verified that chemical labeling was correct. DYN will continue to perform inventories on a quarterly basis and is tracking the data.

APPENDIX E BIBLIOGRAPHY

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APPENDIX F

LESSONS LEARNED AND TRAINING

APPENDIX F

LESSONS LEARNED AND TRAINING

This appendix reports on the lessons learned aspect of the August 4, 1997, memorandum (DOE 1997a).

Fluor Daniel Hanford, Inc. (FDH)

Each U.S. Department of Energy (DOE) formal lessons learned is distributed to the site points of contact (POC) by the Hanford Site Lessons Learned Coordinator. FDH forwards the lessons learned to each Project Hanford Management Contract (PHMC) training department trainer who is directed to review the applicability of that specific lessons learned to his or her facility training. The trainer returns a completed form indicating whether the lessons learned will be included in revised lesson plans and if not, why not.

Several of the major subcontractors have multiple sites and it is necessary to have a number of site trainers reporting the lessons learned. The lessons learned are used in several ways by contractor personnel. The lessons learned are incorporated into lesson plans for continuing training of personnel and discussed at shift meetings, safety meetings, and staff meetings. The use of lessons learned is documented in quarterly reports submitted to the DOE-RL Office of Training. This system gives the training organization a high level of confidence that lessons learned are being used in training and safety related meetings.

An assessment of the PHMC lessons learned program has shown that the program effectively interfaces with the PHMC facility training organizations and that applicable lessons learned are being taught in training courses, continuing training programs, and safety meetings.

Bechtel Hanford, Inc. (BHI)

The BHI Emergency Preparedness organization continues to issue lessons learned from drills and other emergency information sources, including the May 14, 1997, Plutonium Reclamation Facility (PRF) explosion incident, to ensure that the building emergency directors, building wardens, and other BHI personnel who serve as members of the Hanford Site emergency response organization are kept informed and prepared. Other methods used by BHI to communicate lessons learned include:

- one-on-one lessons learned discussions with emergency response organization members
- lessons learned discussions during building warden initial and requalification training
- lessons learned discussions during building emergency director initial and

requalification training

- lessons learned discussions during building emergency director mini-table-top training sessions
- lessons learned topics included in senior staff briefings
- procedure review packages sent to all building emergency directors
- issuing *Safely Speaking* bulletins to all BHI personnel with emergency preparedness topics
- specific Emergency Management Update interoffice memorandums issued to the building emergency directors discussing items such as generic procedures, incident command system, timely notifications, and conservative approach for declaring emergencies.

In addition to the specific Emergency Preparedness lessons learned, BHI has a formal, structured lessons learned program similar to the PHMC. Formal DOE lessons learned and internal BHI lessons learned are distributed to BHI POCs by the BHI Lessons Learned Coordinator. The POCs are representative of every project and functional organization within the Environmental Restoration Contract (ERC), including the BHI training department. It is the responsibility of each POC to review lessons learned and redistribute the information that is pertinent to the project/functional organization scope of work.

BHI will work with the other site contractors on the Emergency Preparedness Action Team/sub-team training to ensure lessons learned from the May 14, 1997, PRF incident are incorporated into training materials and plans.

Pacific Northwest National Laboratory (PNNL)

PNNL has an ongoing management system to take action on lessons learned and to self-evaluate whether the laboratory has management systems and procedures in place that would have precluded the incident from happening. The laboratory also has a mature system to communicate the lessons learned to the management team, staff members needing the information, and the instructors responsible for incorporating the lessons learned into the training. PNNL evaluated the PRF accident and performed a self-assessment of the training needs and impacts. Several recommendations were made for continued management oversight which are ongoing management activities, with established mechanisms in place addressing the oversight that should have precluded a similar incident. An entire issue of the PNNL *Heads Up* (a part of the PNNL lessons learned program) was dedicated to the PRF incident. This lessons learned program *Heads Up* was distributed to appropriate staff throughout the laboratory, and it was incorporated into the training material in selected courses. Managers at PNNL continue to analyze hazards at their facilities and ensure that any control for mitigating hazards identified are developed, implemented, and monitored.

Training

Training for the Drill Coordinators/Controllers and Evaluators course is in the final stages and is scheduled to be taught to site personnel beginning December 8, 1997. This course is being developed through an integrated team consisting of training and emergency preparedness personnel from BHI, PNNL, and FDH and the PHMC major subcontractors.

Analysis of the functions of the building emergency directors has begun on the design and development of training.

PHMC radiation control technicians (RCTs) are being trained in the new incident command structure and the site emergency preparedness process. This includes defining the process and assets required to effectively manage an emergency during routine day operations as well as back shift and weekend activities. This training is included in the RCT Cycle 3 training beginning November 17, 1997.

The Hanford Patrol Operations has established a program for additional training and drills to be added to its annual training program. The lesson plans have been developed and are being reviewed by FDH Training. The new material will be included in a 40-hour course for Hanford Patrol personnel beginning in December 1997.

The training effort has focused on identifying the processes that are changing on site that require training, and working with the teams that are developing the new processes to ensure that the appropriate training will be developed and implemented as part of the process implementation plan and schedule. Additionally, existing training programs are being assessed for adequacy and are being improved. Training materials are being developed in parallel with process review and improvement efforts to minimize development and training time. Some training, specific to improvements as a result of this initiative, has been developed and is being used.